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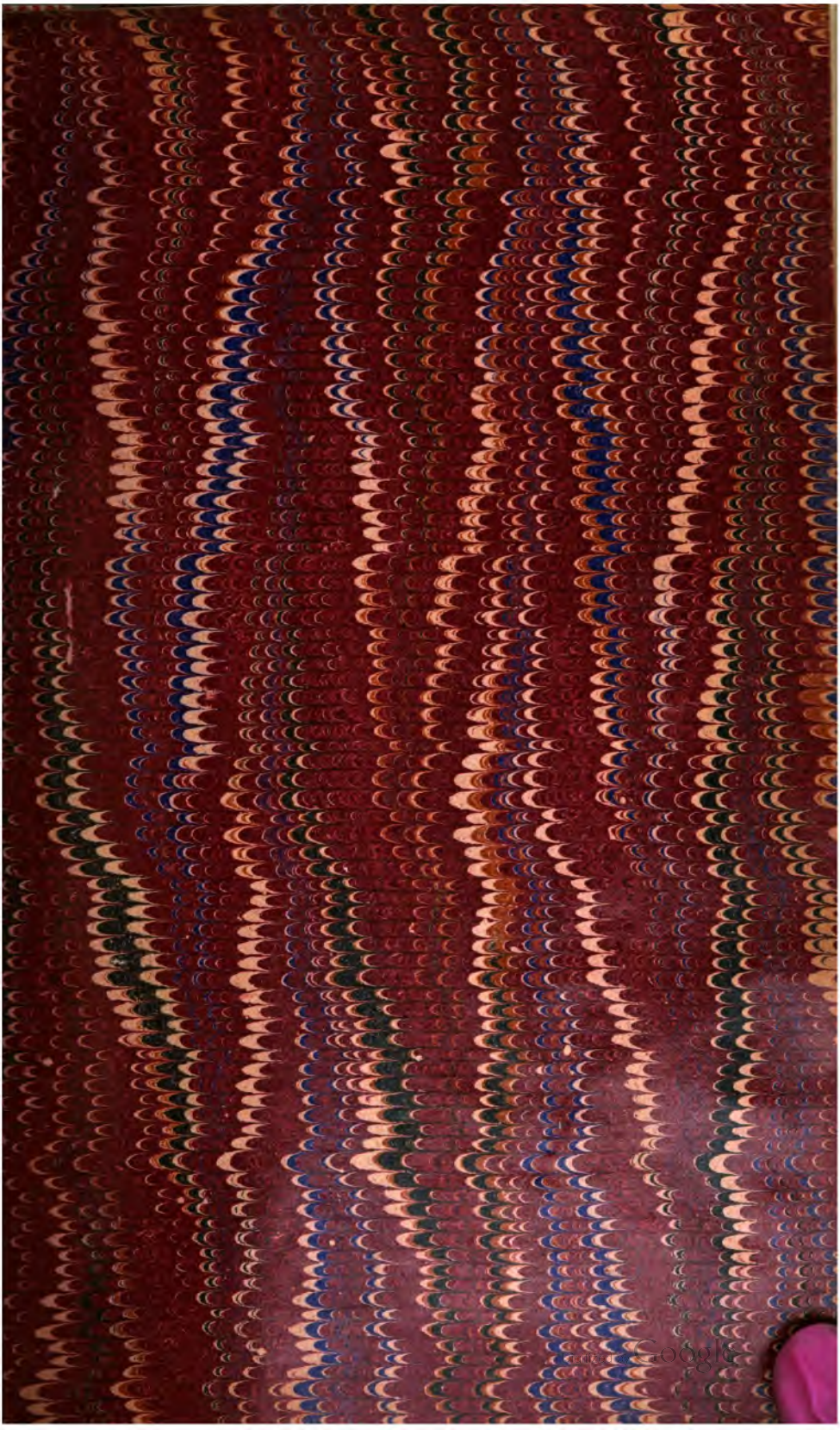

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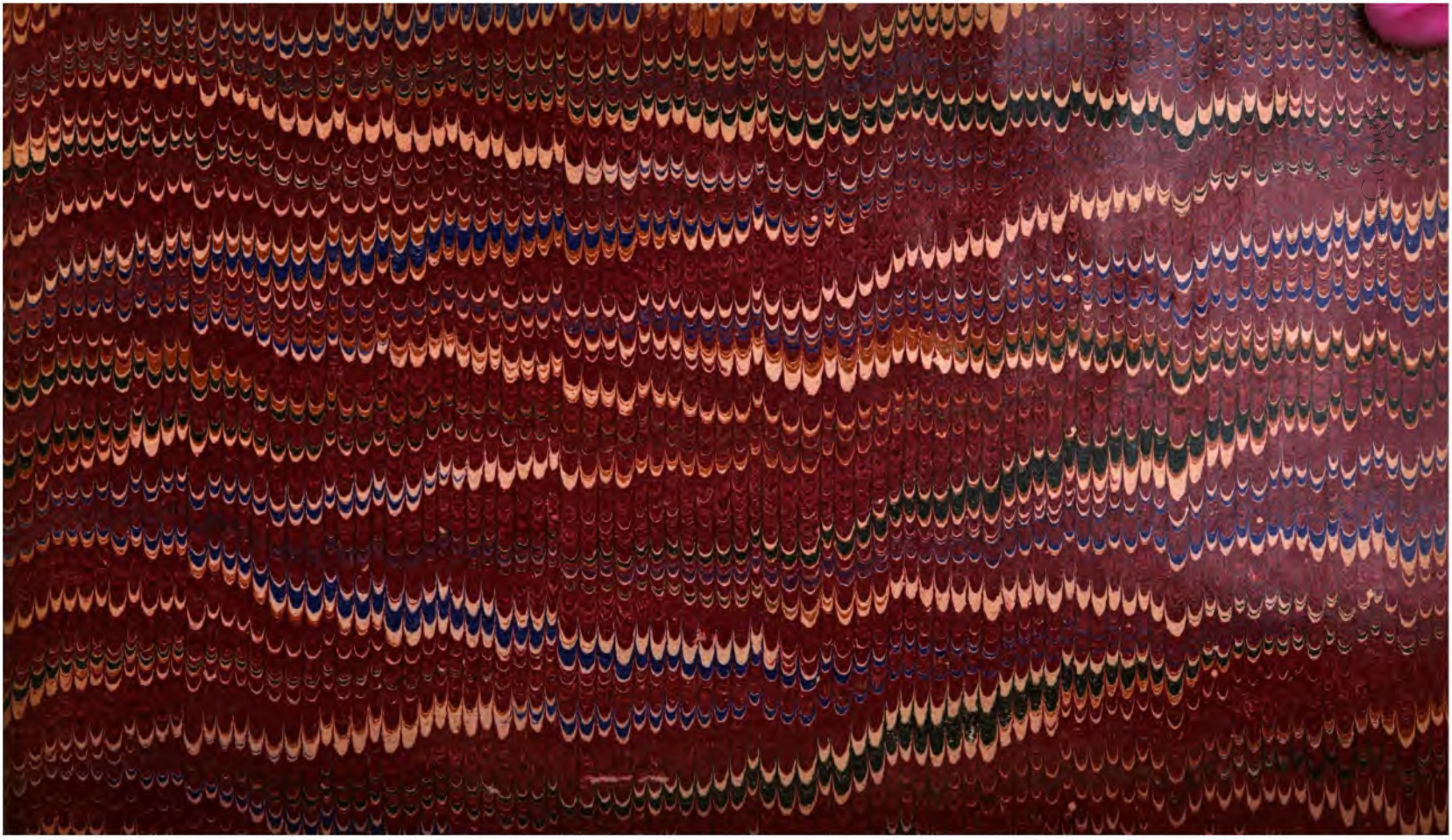

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—May 16, 1888, Death of H. F. WALLING announced, 69; "High Walls or Dams, to Resist the Pressure of Water," by JAMES B. FRANCIS, read and discussed, 69.
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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—January, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JANUARY 4TH, 1888.—The Society met at 20 o'clock, President William E. Worthen in the Chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Channing Moore Bolton, Washington, D. C.; De Clermont Dunlap, Chicago, Ill.; Henry Holbrook Gladding (elected Junior July 1st, 1885), New Haven, Conn.; Arthur Haviland (elected Junior January 4th, 1882), San Antonio, Tex.; Camille Stanislaus d'Invilliers, Philipsburg, Pa.; Charles Hees Ledlie, St. Louis, Mo.; Henry Benjamin Patten, Cheyenne, Wyo.; Frederick John Henry Rickon, Little Rock, Ark.; George Francis Wright, Santa Barbara, Cal.; John Muirhead Stewart (elected Junior March 2d, 1887), Dobbs Ferry, N. Y. As Juniors: Julius Le Roy Adams, Brooklyn, N. Y.; Francis Henry Bainbridge, Wilmington, Del.; Eugene Carroll, Covington, Ky.; Russell Wadsworth Hildreth, Athens, Pa.; Alexander Edward Kastl, Chicago, Ill.; William Anthony Lydon, Chicago, Ill.; Alexander Potter, Kansas City, Mo.

A paper by G. Lindenthal, M. Am. Soc. C. E., on the North River Bridge Problem, with a Discussion on Long Span Bridges, was read by the author, and discussed.

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THE ANNUAL MEETING OF THE SOCIETY.

JANUARY 18TH AND 19TH, 1888.

JANUARY 18TH.—The meeting was called to order at 10.30 o'clock, President William E. Worthen in the chair; John Bogart, Secretary.

It was, on motion, ordered that the ballot for officers of the Society should be declared closed at noon. Messrs. Charles W. Hunt, Arthur Haviland and Edgar B. Gosling were appointed Tellers to canvass this ballot.

The Annual Report of the Board of Direction* was read by the Secretary, and, on motion, accepted.

The Annual Report of the Treasurer* was read by the Treasurer, and, on motion, accepted.

The Report of the Finance Committee* was read, and, on motion, accepted.

The following statement of suggestions made by members of the Society as to the place for the next Convention was read:

Milwaukee was suggested by 155; White Sulphur Springs by 6; San Francisco by 5; Old Point Comfort by 5; Atlanta, Ga., by 5; Pittsburgh, Pa., by 4; Chicago, Ill., by 4; Cleveland, O., by 4; Lake George, St. Paul, Minneapolis, Anniston, Ala., Omaha, Newport, R. I., and New York, each by 2; Atlantic City, Boston, Chatauqua Lake, Cresson, Deer Park, Duluth, Hartford, Kansas City, Lookout Mountain, Louisville, Mackinaw, Marquette, Montreal, Narragansett Pier, Niagara, Philadelphia, Providence, St. John, N. B., Saratoga, Hotel at Stow, Vt., Syracuse, Washington, D. C., and White Mountains, each by 1; that we accept no invitation from any place, but go on our own responsibility, by 2.

A communication was also presented, signed by all the members resident at Milwaukee, Wis., and by the Mayor of that City, requesting the Society to favorably consider the propriety of holding the Convention at Milwaukee.

On motion, the City of Milwaukee, Wisconsin, was designated as the location for the next Convention. The determination of the time for the Convention was referred to the Board of Direction with power.

The discussion of the proposed amendments to the Constitution was made the special order for noon.

The report of the special standing Committee on Uniform Standard Time* was presented and read, and, on motion, accepted, and the Committee continued.

The Special Standing Committee to consider a plan for creating a Library for joint use presented the following report, which was read:

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* Printed separately, following these minutes.

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To the American Society of Civil Engineers:

I beg to report on behalf of the "Committee to consider a plan for creating a Library for joint use," that no satisfactory progress has been made in the matter, and that while my conviction remains as heretofore that such a joint library should be created, I am unable to give sufficient encouragement in the matter to warrant me in asking for a continuance of the Committee.

Respectfully submitted on behalf of the Committee.

WILLIAM P. SHINN,
Chairman.

On motion the report was accepted and the Committee discharged.

The report of the Committee to consider the proper relation to each other of the Sections of Railway Wheels and Rails being called for,

Mr. A. M. WELLINGTON, member of the Committee, said:

Mr. President, Mr. H. Stanley Goodwin, the Chairman of the Committee, has requested me to report that at the time of the last Convention at the Kaaterskill, the Committee had under consideration a very large mass of matter. It was arranged that I should put that matter into shape and draft a rough form of report. At that time we expected to have finished our duties and to present a report at this meeting; but since that time I have lost two months by sickness, and in addition have had a large increase of work of another nature to occupy my attention. I expected to have been able to straighten out the various documents, which have still further increased since the time of the Convention, but I think that I can promise this report for the next Convention.

We ask that the Committee be continued, and in place of Mr. Morison, who has gone abroad, that authority be given to fill his place on the Committee.

On motion, the Committee was continued and the President and Board of Direction were authorized to fill the vacancy occasioned by the absence of Mr. Morison in Europe.

The subject of the existing ambiguity of engineering titles was presented by letter by Messrs. JOHN A. FULTON, M. Am. Soc. C. E., and C. D. PURDON, M. Am. Soc. C. E.

Mr. JOHN A. FULTON (by letter): An old engineer, not a member of the Society, has requested me to call the attention of members to two very ambiguous terms always encountered in railroad construction.

They are "Division Engineer" and "Resident Engineer." If the matter could be discussed at the Society meeting and an agreement arrived at as to which, in the Society's opinion, should be regarded as the higher of the two; and then a circular letter addressed to the various General Managers and Chief Engineers throughout the country, with a request that they adopt its suggestion, some uniformity in the meaning of each of these terms could be arrived at, and annoying mistakes avoided. I trust that some one will take enough interest in this matter to bring it before the Society.

Mr. C. D. PURDON (by letter): Would it be proper to ask the Society to define the use of the names Assistant, Division and Resident Engineers? On some roads in the Southwest the Resident Engineer comes next below the Chief, then Assistant, then Division; on others the Resi-

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dent Engineer is the lowest grade, so that it is impossible, without personal knowledge, to know the exact status of a man who applies for a position and says he has filled one of these positions.

Even if it would not be correct for the Society to make a rule in the matter, their recommendation would do a great deal in making the names of position uniform.

The subject was discussed by Messrs. D. J. Whittemore, A. M. Wellington, John Bogart, J. J. R. Croes, E. L. Corthell and A. Fteley.

On motion it was resolved, That a committee be appointed by the President to formulate recommendations with reference to the Grades and Titles of Engineers on Public Works and to report at a future date.

Subsequently the President announced the appointment of the following members of the Society as such committee: Messrs. D. J. Whittemore, Albert A. Robinson and James L. Randolph.

The hour of noon having arrived, the ballot was declared closed.

The consideration of the proposed Amendments to the Constitution, having been made the special order for this hour, was then entered upon.

The following amendments as regularly submitted and as previously sent to all members, were then read:

A. 1. Amend Article XVI of the Constitution by substituting for the present Article the following:

Constitution.—*Article XVI.*

The active members of the Society shall be divided into three classes, to be styled respectively Members, Associate Members and Associates, and each person, when duly elected and qualified, shall receive a certificate of membership indicative of the class to which he belongs.

Associate Members shall have all the rights and privileges of Members excepting the right to hold office or to vote upon admission to membership or changes in the Constitution and By-Laws of the Society. Associates shall have all the rights and privileges of Members, excepting the right to hold office or to vote.

There shall also be a preparatory grade, to be designated Students of the Society, who shall have the right to receive the Transactions of the Society and to present papers and written discussions. They shall also have the right to use the library and rooms of the Society, and to attend its meetings subject to such regulations and restrictions as the Board of Direction may adopt.

Members of the Class previously styled Juniors, shall after March 7th, 1888, be classed as Associate Members.

2. Amend Article XVII of the Constitution by substituting for the present Article the following:

Article XVII.

A member shall be a Civil, Military, Mining or Mechanical Engineer, not less than thirty years of age, who has been in active practice as such for at least ten years, or has graduated at a School of Engineering and been in practice seven years, and who has had responsible charge of work as Chief, Resident, or Superintending Engineer for at least two

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years, not as a skillful workman merely, but as one qualified to design as well as to direct engineering works.

An Associate Member shall be one not less than twenty-four years of age, who has had actual practice in some of the branches of Civil, Military, Mining or Mechanical Engineering for at least five years, or has graduated at a School of Engineering and been in practice two years, and who continues in actual practice at the time of his application for membership.

An Associate shall be one not less than twenty-five years of age, who is a manager of a railroad, canal or other public work; a geologist, chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit; qualifying him to co-operate with engineers in the advancement of professional knowledge; but shall not himself be practicing as an engineer.

A Student shall be one not less than eighteen, nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an Engineer, and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent Engineer for not less than two years. A Student shall not remain in that grade for more than seven years; if not elected to a higher grade his connection with the Society shall terminate at the end of seven years, or upon his attaining the age of twenty-seven years.

3.—Amend Article XVIII of the Constitution by substituting for the present Article the following:

Article XVIII.

Nominations and proposals for admission to the Society, except to the grade of Student, shall be endorsed by at least five members, who certify that they personally know the nominee or candidate, and that he is worthy of acceptance. The proposal for Member, Associate Member, or Associate, shall contain a statement, over the candidate's signature, of his age, residence, the nature and term of his professional service, and that he will conform to the requirements of membership, if elected. Fellows shall not be required to present themselves as candidates; those making the nomination shall state the ground therefor, and certify that the nominee will accept, if elected. Nominations for Students shall be made out as for other grades, but the endorsement may be signed by a Member, Associate Member, or Associate, and but one such signature will be required. Such nominations shall follow the usual course of procedure for other grades except submission to a letter-ballot; the Board of Direction shall elect or reject the applicant.

A proposal for transfer from one class to a higher shall be made by at least five members, and shall state the age of the candidate, and the nature and term of his professional service since his admission to the Society. Such statement shall show a degree of qualification sufficient to render the proposed eligible to election in the class to which transfer is asked. Upon the approval of the Board of Direction, the candidate shall be balloted for, as provided in the election of members; and when the transfer is made, he shall be required to pay as an additional entrance fee the amount of the difference between the entrance fees of the two classes.

4.—Amend Article XIX of the Constitution by adding a clause at the end thereof, making it read as follows:

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Article XIX.

In elections for membership of either class, Members shall vote by letter, or by ballot in the usual way, and the result shall be announced at the next regular meeting held after twenty-five days have elapsed from the time of mailing the notification. Five or more ballots cast in the negative shall exclude. Members notified but not responding shall be classed as having voted in the affirmative. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

In the election of students by the Board of Direction, one negative vote shall exclude the applicant.

5.—Amend Article XXVIII of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XXVIII.

Upon the written request of ten or more Members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a satisfactory defense made, will then notify the member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the Member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall in any event be the only public announcement of the matter. A Student may be summarily expelled by a majority vote of the Board of Direction at any time.

B. Amend Article XVIII of the Constitution by inserting after the word "*acceptance*" at the end of the first clause of the Article the following:

"But the proposals for admission to the Society, of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance."

C. Amend Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, and requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open ballot,

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and five or more ballots cast in the negative shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall not be less than 25 days after the Secretary has issued the notice above mentioned."

D. Amend Article XIX of the Constitution by substituting for the whole Article the following:

Article XIX.

Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

The President stated that under the provisions of the Constitution these proposed amendments were now in order for discussion, and that they could be amended in any manner pertinent to the original amendments by a majority vote at this meeting.

The amendments were then discussed.

Mr. J. J. R. Croes.—As any material changes would necessarily interfere with the main idea of these proposed amendments and prevent the Society, as a body, voting upon the main question at issue, certain members who had proposed to offer amendments to these have decided to withdraw any proposition for changes, and ask simply that the amendments, as proposed by the committee, go out for letter-ballot to the Society as they stand, with such discussion as may be had at this meeting, so that all members may fully understand the subjects at issue.

The ground of opposition to the proposed changes in the Constitution is stated succinctly in the circular which was sent out to the members recently, and is as follows: "This Society is not an institution for primary education, but is intended to be an association of skilled and experienced engineers for mutual improvement by the interchange of ideas and experiences of a character more advanced than can be fully understood by novices in professional work. Admission to any grade of membership should be contingent on experience had and work accomplished, and not on the mere desire to learn and the hope of future benefit by association."

It was also suggested to enlarge the definition of the term Civil Engineer, because it really includes all branches of engineering work. Also it was suggested that the full period of study at a preparatory school should not be considered as equivalent to the same period of actual practice in the profession.

The gentlemen present can, of course, express their views on the subject very fully. There are some members who are not able to be present, whose views have been sent, and should be read before the meeting and go out as part of the discussion. I will therefore read these communications.

Mr. M. J. Butler (by letter).—I desire to put myself on record as a

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supporter of those who are seeking to establish a student grade of membership in the Society. I am a member of two engineering societies wherein student grades exist, and I have yet to learn of any objections to them. The great success of the Institution of Civil Engineers of England is largely due to its student grade. The smaller success of the Canadian Society of Civil Engineers is due, not to the students, but to the youthfulness of the society itself.

I take exception, however, to the low grade of qualification called for in a student member.

A student should be a young man not less than 18 years of age nor more than 25; he should have gone through three years of the technical school or have had at least two years' practical experience and study under a practicing civil engineer, and his election should depend on the statement furnished as to his preliminary educational acquirements. A student should be nominated by a Member or Associate Member. An Associate who is not a civil engineer should not have the nominating of any member of this Society.

Mr. ROBERT E. MCMATH (by letter).—I do not think that the creation of the proposed student grade would be a departure from the declared policy of the Society. It is no more than pursuing one step further what was begun when the class of Juniors was established. To the proposition of the committee which drafted the amendments, that there is not room for a student grade below the present Junior, there seems to be no dissent. To the other proposition, that room be made by advancing the standard of qualification for all grades, there is, so far as I know, no serious opposition. But it seems there are those who are not willing that the room so made shall be occupied.

A circular issued by a number of influential and honored members of the Society says: "This Society is not an institution for primary education, but is intended to be an association of skilled and experienced engineers for mutual improvement by the interchange of ideas and experiences of a character more advanced than can be fully understood by novices in professional work. Admission to any grade of membership should be contingent on experience had and work accomplished, and not on the mere desire to learn and the hope of future benefit by association." This is a definition of the objects of the Society that is certainly not consistent with Article II of the Constitution, and, as I understand it, not consistent with the claim made for the Society of being national, or rather continental, in its scope. If the statement quoted is intended to hinge upon the word primary, then it is not pertinent to the subject before us, for no one proposes that the character or style of papers and discussions be changed, unless for the better. The clause in Article II of the Constitution, placing "the professional improvement of its members" as first in the objects of the Society, is meaningless unless a leading object is education. The only question is

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the age and relative standing of the classes. The proposition pending defines the age and standing of three classes, which might be styled Senior, Intermediate and Preparatory. I assume that we all wish to be learners to the end of our lives. Again, Article II makes "the advancement of engineering in its several branches" the third object. This is meaningless if the work of the Society does not look to the future, not for days only, but years. How can it better look to and care for the future of the profession than by affording facilities and opportunities to those who will be the profession in coming years? To create the proposed grade is to go forward; to reject the proposition is to go backward, for to stand still in an active age is impossible.

The idea of an association of skilled and experienced engineers exchanging ideas and experiences for mutual improvement is much narrower than I am willing to believe is entertained by any considerable number of members; but it is in the line of the, to me, objectionable policy which now withholds our Transactions from sale, and practically forbids republication of papers.

Members will please observe that, practically, the only privilege the student will use is that of owning the Transactions; they can read them now in libraries. It is not possible that any considerable number can avail themselves of the right to use the library and rooms and to attend meetings. Nor may we expect that many papers by student authors will pass beyond the hands of the Library Committee under Section 16 of By-Laws. Hence the inability of novices to understand advanced ideas will not be offensively shown in the presence of their elders. Were it otherwise, I am inclined to think that it would often be a good thing for the elder to see how quickly an idea will be grasped by the novice, and how promptly he will detect the fallacies even of experienced and skillful engineers.

Referring to the last clause of the quotation from the circular, I request attention to the fact that the proposed amendments nowhere speak of students as a grade of membership. Membership begins with the grade of Associate. Students are received without much formality, and may be dismissed with less.

The amendments may certainly be divided into two propositions. First, increased experience and age in all classes; second, the creation of the preparatory grade. To such a division I make no objection, provided that both are submitted to the Society for letter ballot.

Concerning the proposed substitute form of Article XVII, I would remark that the Committee considered the advisability of enumerating the branches of engineering, and decided not to do so, for the very good reason that the branches are not themselves defined. As an illustration, let the "city" engineer find in the proposed substitute the designation under which he would come if his specialty has been street grades and pavements.

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To the proposed change from seven years to eight in qualification of graduate Members, and from two to three of graduate Associate Members, I have no objection; rather the contrary.

Also the striking out of the occupations of Associates is a change for the better. In fact, there are many clauses of the existing Constitution which could be improved in style. But your Committee adhered to its instructions, and proposed only necessary changes, rendered so by the proposed new grade.

Mr. CARL GAYLER (by letter).—The Commitee appointed to consider the advisability of adding a student's grade to the Society state in their report that the only objection raised against the new grade is the danger of lowering the standard of the Society; but it seems to me that there are two other objections important enough to be taken into consideration, namely, the influence of a membership in the American Society of Civil Engineers, even in a lower grade, on the young student, and the distinction in favor of the student, implied in this membership, between him and a young man who is not lucky enough to enjoy a regular professional education.

A student may, generally speaking, be designated as a young man whose parents had the means and good sense to send him to a higher school; he has been more fortunate in that respect than other boys of his age, presumably equally gifted and ambitious as himself. This is all; there is no merit on his part, and it is adding insult to injury to tell the young man who has not had these advantages, "that there is little excuse for any young man who would enter the profession without the advantage of a technical education."

We also know, and we know it partly from experience with ourselves, that the trouble with the student and graduate is his exalted opinion in regard to his own usefulness in life. It is true, actual life will, sooner or later, rub off some of this very pleasant opinion; but it is certainly not desirable to foster and increase the same, as would, in my opinion, be done through the establishment of this new grade.

Taking the case of two young men, one of them either at some high technical school, or under the tuition of some competent engineer, the other without means, working perhaps for his daily subsistence in some shop, with no other tools for his success but such as his own energy and perseverance will furnish him; we invite the former, under the amended Constitution, to a grade in our society, whilst the other sees, in the race for success, a new distinction made between himself and his more favored competitor.

We have to keep in mind that the best men, as a rule, are not those who had the greatest advantages for learning in their youth; and that it is generally the hard battle of life which forms the successful man. By smoothing the path of the student, by adding to his conceit, in a word, by taking a step in the direction of making the career of the civil en-

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gineer from the school up to the chief engineer analogous to that of the West Pointer or of the Government Engineer in Europe, we deviate from the way in which engineering in this country has attained its high standard. The Society does not gain; the student is liable, in my judgment, to lose as much in force of character as he may gain in knowledge, and the young man who works his way up in our profession, without the advantage of a college education, is placed at an additional disadvantage.

I, for one, am opposed to the amendment as far as it relates to a student's grade.

Mr. C. S. MASTEN (by letter).—I agree with the suggestion to strike out from the proposed amendments the clause creating a student grade.

Mr. EDWARD S. PHILBRICK (by letter).—As I shall not be able to be present at the Annual Meeting of the Society on the 18th, I wish to express through you my disapproval of the proposed amendment of the Constitution establishing the grade of students, for the following reasons, viz.:

The class of young men for whose benefit this change is proposed are already fully supplied with all the reading matter which they can well digest through the technical schools and public libraries within their access.

I think, therefore, that the probable encumbrance of this new class of members in the use of the Society's library and rooms, and the introduction of crude matter into papers and written discussions from this new source, would be much greater than would be justified by the probable advantages to the young men themselves.

I have for many years been acting on the Board of Government of the Massachusetts Institute of Technology, one of the best technical schools in our country, and it is well known to all its faculty that young men who are about to enter professional life are too apt to grapple with questions beyond their depth, and expect, with sanguine hopes, to solve in a few months many questions which have defied the acumen of past generations of scientific men. In short, such men are always "biting off more than they can chew."

The present status of this class of young men among us is far more favored in regard to resources for acquiring professional lore than in any other age or country with which we are familiar. What they need most is not mere reading matter and discussion, but practical work. They will learn more that is of real use to themselves at that age by joining a field party in Arizona, or even by stoking a locomotive for a few months, than by digging in our library for a year.

That library is of great value to the working engineer, the man who has to meet new questions in physics or constructive work, and who must qualify himself to grapple with them by the experience of others in the same field. Such questions can never be foreseen by the student. If he attempts to study them all, he will have to spend his whole life in

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the library. He may then become a walking encyclopedia, but not an engineer. I should therefore favor the proposed amendment to the amendment.

Mr. A. GOTTLIEB (by letter).—I agree with the proposition to strike out of the amendment the creation of a student grade. I do not agree with other points in the circular, lengthening the time of previous practice, as I think that the important point is not the number of years, but the actual responsible charge of work.

Mr. AMORY COFFIN (by letter).—I heartily approve the objections to the proposed student's grade.

Mr. D. M. GREENE (by letter).—I am in favor of striking out the proposed new grade of student.

Mr. JAMES L. RANDOLPH (by letter).—I approve the idea of striking out the provision for a student grade. I think the requirements for Associate open the doors wide enough. To me the student grade seems like setting up an opposition to the Engineering News, Railroad Gazette, etc., and to schools.

Mr. WM. PIERSON JUDSON (by letter).—I fully agree with views expressed in the circular dated January 5th, 1888, regarding the proposed amendments to Articles XVI and XVII of the Constitution.

Even if there is a demand, which I doubt, for the suggested Kindergarten Annex, the Society cannot make the change without lowering its standing.

In Article XVII, also, your form of amendment is much to be preferred for the same reason.

Mr. CLEMENS HERSCHEL (by letter).—The matter referred to in the circular has been quite fully discussed, and I will only say that I am glad this stand has been taken, the sentiments of which will, I trust, prevail in the society.

Capt. O. E. MICHAELIS (by letter).—I cordially approve the amendments offered in the circular.

Mr. JOHN A. FULTON (by letter).—Concerning the proposed grade of "Student of the Society," it appears to me that having become such a student the enterprising young man will be likely to mention as a part of his credentials, and truthfully too, that he "belongs" to the Am. Soc. C. E.

The person to whom he applies for work will ordinarily know nothing whatever of the various grades of membership, and will be very apt to think that an engineering society that would admit as members persons having only "youth and inexperience to recommend them," cannot be entitled to any great amount of respect.

It seems as if the adoption of such a measure would have a tendency to injure the Society's present standing without having the virtue of benefiting the "Student of the Society," who, however well meaning in his intentions, will appear to the average public as something of an impostor.

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I am in favor of the amendment to the amendment of Article XVI, and am in favor of the amendment to the amendment of Article XVII.

Mr. LEWIS KINGMAN (by letter).—I think it to the interest of the Society that the amendment proposed to strike out that portion in reference to students and amend the rest of the Article as the circular suggests, should be carried, and I will vote for those amendments.

Mr. JOHN A. WILSON (by letter).—As to the matter of students, and the definition of the term Civil Engineer, I fully concur in the views expressed in the circular.

The proposition to create a grade of students in the Society, probably is based on the existence of a student grade in the Institution of Civil Engineers of England. An examination of the constitution of that institution shows that to make a man eligible as a student he must be a pupil of a corporate member of the institution. In this country the circumstances are entirely different, and we have no system of apprenticeship or of articled students in engineering offices. The English institution does not throw its doors open to all indiscriminately who fancy that they would like to become engineers, and I see no good reason why our Society should do so. The way in which the subordinate positions on engineering work are manned in this country makes it almost impossible to discriminate or to establish any definite rule by which admissions to a student grade could be regulated, and the practical result of establishing such a grade would be to flood the Society with an element that would not only be objectionable but a positive nuisance.

I do not, however, agree with the proposed change in the name of that grade which now is classed as Juniors, and would suggest that the name Junior Member be adopted. Is it not a mistake to have a grade of Associate Members and also a grade of Associates? It seems to me that the term Associate Member is a misnomer. As proposed in your amendments an Associate is not a Civil Engineer, and therefore cannot become a member; but an "Associate" or Junior Member, being a Civil Engineer, can become a full member. The class which you now propose to call Associate Members are in reality Junior Members, both in fact and by definition. I would therefore suggest that your amendment be further amended by changing the name Associate Members to Junior Members.

The other points in the amendments more clearly define the status of the various grades in the Society, and avoid much of the ambiguity which now exists as to where applicants for admission to the Society should be classed. With the exception which I have made I am decidedly in favor of the amendments as you propose to make them.

Mr. JOSEPH M. WILSON, Mr. CHARLES G. DARRACH, Mr. HENRY W. WILSON, and Mr. HENRY B. SEAMAN (by letter).—We concur in the views expressed in the foregoing letter of Mr. John A. Wilson on the subject of amendments to the Constitution.

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Mr. J. S. SEWALL (by letter).—I think the proposed amendments to Acticles XVI and XVII of the Constitution ought to be amended by striking out the sections creating and defining the grade of students. I also approve the other verbal amendments to the proposed Article XVII as printed in your circular dated January 5th, 1888.

Mr. H. W. CLARKE (by letter).—The term Civil Engineer is certainly broad enough to cover all classes who are now eligible to election as Member. Eligibility is, I think, much better defined in the amendment as proposed in the circular than in the original article.

With so many well equipped scientific schools in the country, I do not see the necessity of formally establishing a student grade. I think there is nothing in the present Constitution or By-Laws which totally debars a bright young man, studying in the office of a member, from referring to books in the library when the privilege may be asked by his chief. And I think our meetings are not so secret but that any reputable Non-member, introduced by a Member, may attend them.

Mr. HENRY N. BABCOCK (by letter).—I was surprised at the way in which the Convention last summer (which I could not attend) was carried away with the idea of infant baptism, so to speak, attempting to supervise the education of prospective engineers and to receive them into the Society before they have decided what their occupation is to be. It is a sort of missionary work proper enough for the colleges and their professors, but seems outside the purpose of a Society of Engineers.

Mr. JAMES G. DAGRON (by letter).—I am heartily in favor of the proposed raising of the standard for admission to the different grades of membership. The Society should, above all, aim at quality and not quantity, so that it may truly become the representative body of American engineering, to be elected a member of which should be the highest honor that could be rendered an engineer by his peers.

I am opposed to the proposed grade of student, for the reason that while many young men study engineering and think they are called to the profession, on the other hand, but few are chosen; for many find on entering practical life, that their inclinations and aptitudes lead them in other directions. Therefore it would seem unwise to give them any connection with the Society until they have shown by a continuance of actual practice in engineering, that they will persevere in the profession. The grade of student in the Institution of Civil Engineers answers to a want which cannot well be said to obtain in this country. In England, young men desirous of entering the profession, do not, as a rule, attend special schools, nor pursue special studies, but enter the office of a practicing engineer, where they become veritable apprentices; after some years of this practical training, they start out for themselves as full-fledged engineers. In this country, on the contrary, theoretical education in one or another of the many Engineering Schools now extant, is obtained before entering upon practical life. This custom

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is becoming the rule instead of the exception, and although the standard of many of the Engineering Schools could stand judicious raising, the time is coming when it will be fully recognized that any young man who enters the profession without preliminary theoretical training will do so considerably handicapped in the race for professional advancement.

I believe that in France and Germany, where preliminary theoretical education is the rule and not the exception, none of the professional societies have ever felt the need of or created a grade of student. I fail to see wherein such a grade would add to the standing of the Society, and if a lower grade than the proposed one of Associate Member is needed, why not retain the present grade of Junior with its present requirements, which are surely low enough.

I believe that the full period of study at an Engineering School should not be considered as equivalent to the same length of time spent in actual practice of the profession.

On the grounds above stated, I am in favor of the proposed amendment to Articles 16 and 17 of the Constitution, as proposed by the circular.

The proposed amendment D to Article XIX is, I think, a step in the wrong direction. It would seem to me to be unwise, impolitic and unsafe to place the election to membership in the hands of a majority of the Board of Direction, which might become a close corporation and wield its power to the detriment of the Society's best interests. With the elections to membership controlled by the membership at large as at present and a strict Board of Directors to closely scrutinize applications, it would seem that it would be more difficult for unfit candidates to secure elections, as in most cases they are known to members other than their five proposers, and these latter in case of known unfitness have thus a chance to communicate their knowledge to the Board of Direction for action. Any injustice that might be done to a candidate through prejudicial black-balling would be offset by the proposed amendment C to Article XIX if adopted.

Gen. W. S. Rosecrans (by letter).—I think the proposed amendment to Article XVI of our Constitution objectionable. We ought not to create the grade of student. In my judgment, the effect of it would be to lower instead of to elevate the dignity of membership, which ought to be sought and attained only by solid experience and thorough work.

For this reason, wherever the clauses concerning students occur in the proposed amendments to the Constitution, they should be stricken out.

For the proposed amendment to Article XVII, I prefer that suggested by the circular.

Mr. D. Farrand Henry (by letter).—Certainly, I agree with the circular. If members want their children educated—which, I presume,

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is the true inwardness of this move—there are plenty of places where they can be sent without making a "district school" of the Society.

I should say, let the children of members have use of the library when in the city, but before they can become connected with the Society, let them be engineers in something beyond "intent." Civil Engineer is a generic term and should be retained.

The other points are good and consequential.

Mr. GEORGE Y. WISNER (by letter)—I fully agree in the objections to the proposed amendment to the Constitution, that the Society is not intended to be an institute for primary education, and besides, I fail to see how the proposed student grade can accomplish even that purpose outside of the few who may join in New York City.

Mr. FRED. BROOKS (by letter).—I think fairness requires that the Society should have the opportunity of voting by letter-ballot on the question of establishing a grade of students. The annual meeting may determine what particular conditions of admission of students shall be the subject of the letter-ballot; it may recommend that any amendments to the Constitution proposed for establishing a grade of students be not adopted; but it ought not to cut off from submission to letter-ballot some such proposed amendments. A motion to that end might, in my judgment, be ruled out of order as impertinent.

Col. J. W. ADAMS (by letter).—The objections to creating this grade of students are so tersely and happily expressed in the circular, that nothing which I could say would add one particle to its force.

There are those who are ready to write pages of weak argument in favor of that grade being introduced. I have read some of it, and I know the writers as advocates for bringing the entire body of self-styled engineers in the United States, if possible, into the American Society of Civil Engineers, on the ground that numbers alone confer strength, thus lowering the standard of the Society in the public eye (for the dollars they bring), to that of a mere "Union" of workers in the same business, where individual qualifications may be what they may.

I read this morning as an argument for the new grade, "Who can, in cold blood, object to the granting of such limited privileges as these (alluding to the student grade) to every qualified and vouched-for applicant, who wants them and is willing to pay for them." The "wanting and willing to pay" was not considered as a valid argument even for selling our Transactions in open market, still less should it be for selling our good name.

And another "in the Institution of Civil Engineers, they (the students) are nearly as large in number as the grade of member." How long, I would ask, would it be, here, before some such advertisement as this would appear:

"Mr. ——— is open to an engagement as engineer to any company about to undertake public improvements. Late a student in the American Society of Civil Engineers. Terms moderate."

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There are scores of educational asylums throughout our country ready to confer the degree of full-fledged Civil Engineer on its graduates. Is our Society equipped for going into competition with these, and manufacturing engineers at a much cheaper outlay?

No—my advice would be, to open your doors to no one (aspiring to engineering honors) of any grade, unless he brought with him something of professional experience and reputation to add to the common stock.

Mr. A. M. WELLINGTON.—Since Colonel Adams has seen fit to specifically refer to certain statements written by me and published in *Engineering News* of January 14, 1888, I must request the republication of the part of the article to which he more directly refers, in order that members may judge for themselves how fair and how well founded is the interpretation which he has seen fit to put upon one or two expressions; premising only that for a person to enter the student or any other grade in this or any other Society he must have the four qualifications enumerated below, viz.: (1) He must be properly qualified; (2) he must be properly vouched for; (3) he must want the privileges of the Society; (4) he must be willing to pay for them. The following is the extract referred to:

"Is it, or is it not, the view of a majority of the Society that 'the mere desire to learn and the hope of future benefit by association,' combined as it must be of necessity with good moral character and standing and a certain minimum of study or experience, is an insufficient qualification for admission to any grade of the Society, either actual or potential? To the vast majority of the Society such a question will almost answer itself. If the 'mere' 'desire to learn and hope of future benefit' are not a sufficient qualification for the limited privileges which it is proposed to grant to these 'novices in professional work,' what are sufficient grounds for such gracious favors? What are these privileges? They may be all listed thus: (1) To pay $6 to $10 per year; (2) to receive the printed publications of the Society; (3) to present papers and written (not oral) discussions, which if deemed worthy will be printed, and if not will be waste-basketed; (4) to have their names and addresses printed in the Society lists in a separate roll; (5) to use the library and rooms of the Society to the extent and in the manner which the Board of Direction approve of from time to time; (6) to attend (not take part in) certain of its meetings, subject to the same provisions, until such time shall come that the Board thinks it better to provide for special meetings of students, as in England, and to exclude them altogether from the regular meetings. Even these privileges no one can obtain if a single member of the Board of Direction objects, and he holds them only during the will of the majority of that Board or until attaining the age of twenty-seven years, when they cease abruptly and he is dropped from the rolls of the Society, unless he has previously been elected to one of the permanent grades.

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"Surely he must have a somewhat dog-in-the-mangerish disposition who can in cold blood—and realizing what he is doing—object to the granting of such limited privileges as these to every properly qualified and vouched-for applicant who wants them and is willing to pay for them. If it will in fact make the society 'an institution for primary education,' or for any other kind of education, which it is not now, so much the better. The gentlemen who issue the circular boldly assert that that is not a purpose of the Society, but unless it can be shown that it will not tend to 'the advancement of engineering in its several branches,' or will do more than corresponding damage to the other work of the Society, we are compelled to differ from them. To assert that it will do such damage, as for instance, tend to 'dilute' the Society, is indeed possible, but only by ignoring plain facts. On the contrary, a chief merit of the proposed measure is that it will make it possible to maintain what is not now maintained, a really high standard for admission to the higher grades. The 'dilution' comes in in attempting to crowd all grades of experience into one or two grades, as the only alternative to excluding altogether; and it has had, and will continue to have, unless corrected, a very injurious effect upon the standard for full membership."

As statements in various of the letters which have been read seem to be based on a misapprehension of facts, I desire to add further that the requirements for the admission of students to the Institution of Civil Engineers are much lower than those fixed in these amendments, being thus set forth in the form of proposal: "That he is upwards of eighteen years of age and is under twenty-five years of age; and is, or has been, *bona fide*, in the course of preparation and training under me with the object of becoming engaged in the design or in the construction of such works as are comprised within the profession of a civil engineer, as defined by the charter." I am informed that a very large and rapidly increasing proportion of those who enter as students, do so as undergraduates, or very recent graduates, of the numerous engineering colleges in England; such as Kings College; Owens College, Manchester; Liverpool College; Edinburgh School of Engineering; Glasgow University; University of Cambridge (which has a fine school of engineering connected with it); Chatham Military School, and others. As soon as a young man enters any of these colleges he is eligible as a student of the Institution if over eighteen, and I am informed that many so enter. As it will hardly be claimed that the Institution of Civil Engineers is engaged in "primary education" in any objectionable sense, the objections raised to this measure on that score, which seem to be the principal solid basis of objection, fall to the ground.

Mr. M. COHEN.—Mr. President, it seems to me that this matter resolves itself simply to this: what is the benefit to the American Society of Civil Engineers from the adoption of these amendments? There may possibly be another question that we all propose to answer, somewhat

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different from the first, and that is, whether the ultimate benefit to the American Society of Civil Engineers will be sufficient to warrant the immediate benefit to somebody else. The benefit to the Society can only be from the sale of some of its Transactions and Proceedings to the new student. Even supposing that we may be greatly benefited by the papers which these young men may be capable of producing and reading before us, there would not probably be a great many of these, so that all we would gain would be the sale of our Transactions. Now, what would be the benefit to future members? We will introduce here a number of young men as students who will attend the meetings of the Society, and will use, to some extent, its library. These young men will, in exchange for a moderate fee, have these facilities and receive the Transactions.

They may be benefited, it is true. Would they not receive precisely the same benefit by receiving the Transactions only? I think they would. The facilities of the library here could only be used by resident students; those residing in the City of New York. And where are there students of civil engineering in the City of New York? Our American Society is not the Institution of Civil Engineers; they are entirely different. We have no student apprentices. The students are the scholars of the various technical schools in the city and its neighborhood; they may be benefited; they can come down here to these meetings of the American Society of Civil Engineers, and after the meetings—they can go somewhere else, if they desire. And what is the ultimate benefit to us? I say, nothing. The mass of our students of engineering throughout the country are scattered over the broad land. They cannot get any benefit except from the receipt of the Transactions; the only benefit to them is their receipt, for a small consideration, of our Transactions.

There is another view of that branch of the subject. The local schools then could recommend to the parent the great facilities that his son would enjoy by his proximity to the Society of Civil Engineers; that he had only first to attend the school and then could be readily admitted to associate with these gentlemen, and you can readily see the benefits to be derived thereby by these schools. It helps the schools in the neighborhood, but I don't see that it helps the Society. It seems to me that all that is desired by those who advocate this measure can be reached without interfering with the Constitution.

Mr. WILLIAM H. PAINE.—I would like to say, as one of the Committee upon that amendment by which students could be admitted to this Society, that I did not attend the Convention. I was myself personally opposed to the whole scheme, but as it seemed the sense of the Convention at the time that Committee was appointed, to have the student grade added to the other grades, it remained the duty of that Committee, that some way should be arranged, and such alterations of the Constitution should be made as was necessary, and that those alterations should

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be considered and brought forward by that Committee. We have, with all due diligence, labored to make that arrangement of the Constitution which will permit this adding of the new grade; yet, on the question of whether the student grade be adopted or not, I shall vote to the contrary, although a member of that Committee.

Mr. THEODORE COOPER.—Mr. President, at the Convention I took the stand of opposition to the admission of students, and I think my opposition has been fully indorsed by the committee who arranged the proposed amendments; they acknowledge what I claimed, that there was no room at the bottom in this Society, but that there was room at the top. They have raised the standard for all grades of membership in the Society. As the amendment now stands, there is no objection to it—even with the student grade in it, as they now put it. Now, I desire to retreat from all further opposition, and I indorse the proposed amendment for the reason that there are no students to come into this Society. There is no demand by young men or boys; we might have a dozen students at the end of the year, but they would probably withdraw at the end of the next year. The American boy is not willing to acknowledge his inferiority to the President of the Society. You cannot get at the young man who wants to join the Society in this way; he will not come in as a student; he will wait till he can come in some other grade. In fact, take the young men who are almost old enough to come in as Members, as the case is now; they say, "We don't want to enter the Society as Juniors; we will wait a year longer and become Members." At the Convention one of our able engineers mentioned that he had forty young men who had been under his employ in the great aqueduct waiting to come into the Society as students; that they were waiting for this amendment to come in as students. I think they are waiting to come in as members.

I don't believe there is any demand at all for such a thing; therefore I say there is no harm in having this amendment passed; it will only cost a few extra lines of printing in our Constitution. But taking this whole matter as it stands, it is excellent; it is raising the grade of our membership, and I would rather see the whole amendment passed as it stands to-day than lose all by wiping out the student grade. But in the discussion of the student grade and of the amendments to the Constitution, we have got to be very careful to see that they do not conflict with many other things. After this discussion I hope some gentleman will move that the whole subject be referred to a committee, so that we can get it in good shape. There are matters of composition, and there are one or two very vital points to be considered. For instance, at the end of the first clause—"Members of the class previously styled Juniors shall, after March 7th, 1888, be classed as Associate Members." I object to that. Ought not the men who are now Juniors come into the Society the same as any other member and be classed according to their qualifications? Why should we

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pass them along? I am not reflecting on any one; I am not reflecting on any member of the Junior class, but if they are worthy let us pass them, and if unworthy let us sift them out. I may mention one case of a man who has been a Junior for nearly fifteen years. Now, are we going to pass that man without an examination? I say they should be tested to know whether they are qualified. Having done that, I have no objection to the amendment as now presented.

Mr. ROBERT MOORE.—Mr. President, what is the question?

The PRESIDENT.—Under the Constitution, these amendments are open for discussion.

Mr. MOORE.—Is there a vote to be taken on them?

The PRESIDENT.—There is a vote to be taken upon them by letter-ballot, as they now are, if not amended; if amended, as amended. The vote is to be taken by letter-ballot of the whole Society.

Mr. CROES.—Any amendments pertinent to the original resolution may be made at this meeting; if approved by the Annual Meeting, the amendment in that shape goes out, and only in that shape; there is no alternative ballot; there is an absolute ballot on the amendment as now perfected. This is to give an opportunity for any alterations of the amendments which may be found necessary by the Annual Meeting. If there are any amendments to be made pertinent to the character of the whole amendment, they can be made here.

Mr. E. P. NORTH.—Is it impossible, Mr. President, to vote on this amendment in parts; can it be presented in two different sections? That is, to take what is generally regarded as an improvement, the raising the standard of Members and Associates as one question, and the question as to the admission of the student grade as another? I believe there is no objection to raising the standard; the only question is in regard to the admission of students. Can this amendment be put out in two sections, so that a man can vote on one and not on the other?

The PRESIDENT.—As I understand it, this amendment has to be voted upon as a whole, not in parts.

A MEMBER.—We could not strike out one part of that amendment and have it amended as pertinent to the original amendment; that would be very impertinent. We must vote for it as it stands; we surely cannot strike out one part of it and have it remain pertinent.

Mr. CROES.—That is precisely why the proposed amendment to the amendments was withdrawn.

Mr. T. C. KEEFER.—I think there has been some misapprehension in regard to what is a student in the English Institution. That studentship is not confined to apprentices and articled clerks; it is open to students in the engineering classes in any of the colleges of the Empire. We have in Montreal, in the engineering class in McGill College, students of the Institution of Civil Engineers.

Mr. ROBERT MOORE.—Mr. President, as one of the committee which

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presented these resolutions, I may perhaps explain somewhat the position of the committee. As we understood our duties in the matter, it was to formulate amendments to the Constitution which should admit the grade of students, whether we personally favored that grade or not. We understood that the meeting at the Kaaterskill had been, on the whole, favorable to the admission of the student grade in some form; the question then arose as to the form in which such a grade should be admitted. In canvassing the matter, it seemed to us very clear that there was no room for the admission of this grade, except by advancing all the other grades. The only thing we could do was either to raise the standard of all the grades or to declare that we could not formulate any proper method by which the student grade could be admitted. It required changes in the Constitution advancing the grades of membership, and introducing the additional grade of Associate Member, and so making the grades of membership correspond to the grades of the Institution of Civil Engineers. After a great deal of conversation and reflection we concluded to make the recommendation as it stands now. Provided, and only provided, that the other grades of membership were advanced, we would recommend that the grade of students be admitted, and I think that the committee were unanimous in feeling that, unless the whole amendment could go together, we were opposed to the admission of the grade at all. There were some other points on which the committee were not unanimous. The terms of the amendment as proposed were not satisfactory altogether to the committee, and without some further amendment I think that the members of the committee would not be sorry to see the whole proposition defeated. I refer particularly to the matter of associate membership. To some of us it seemed of very doubtful propriety to admit a second grade of membership to be called Associate Member. It seemed of doubtful propriety, unless we could postpone the admission of a person to membership until they had reached maturity of years, until they had had practical experience sufficient to show what they were made of, so that we found we were all agreed in postponing the time of admission to membership until the age of thirty, increasing the requirements as to experience, and also providing a grade of Associate Members of young men of less experience; but, as the amendment now stands, a man might be an Associate Member for life, and on that there was a divergence of opinion in the committee, and a further amendment to these articles was drawn up by Mr. McMath, one of the members of the committee.

But I would personally prefer to see this proposed amendment made still more sweeping. I would like to propose a further amendment to Article XVII, that the connection with the Society of Associate Members who are not transferred to the grade of Member or Associate (in which latter grade a man need not be a civil engineer at all), ten years after admission to Associate Membership, shall cease. The idea is that, unless they are

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transferred to membership at the end of ten years, they shall cease to be members at all.

Mr. CROES.—Is Mr. Moore ready to offer such an amendment now?

Mr. MOORE.—Yes, sir.

Mr. CROES.—We want to have a definite proposition before us. I intended to move that the amendment be sent out without amendment. You move to amend?

Mr. MOORE.—Yes, sir.

Mr. E. S. GOULD.—Mr. President, I wish to say that I am very much opposed to the creation of the student grade. So much has been said against the creation of this grade, and my own views have been so much better expressed by other members than I could have done, that I could perhaps only say what has already been said. But I will say that I am, myself, very much opposed to the creation of such a grade. I think it would be a mutual disadvantage instead of a mutual benefit. As every point almost has been gone over thoroughly and well, I would simply say that it seems to me the only advantage to the Society from this grade would be the fees which it might add to the treasury; and as to the students themselves, I entirely coincide with the views already expressed, that they would derive a very slight benefit from such a limited association as this. There has been a great deal said in excuse of the creation of such a grade, that the young men would not avail themselves of it, and that they would be very generally gotten rid of, and that would be one reason why there would be very little harm in their admission; but, under those circumstances, there would be very little reason for the creation of such a grade, and I shall certainly vote against the proposed amendment.

The SECRETARY.—Mr. President, Professor Burr, Member of the Society, has forwarded the following discussion on this subject:

Mr. WILLIAM H. BURR (by letter).—The propriety of this amendment rests primarily on the scope of the Constitution, for if the objects of the Society, as set forth in that instrument, do not permit the formation of such a grade as that of "students," it is idle to discuss the feasibility or advisability of its creation. Article II of the Constitution reads as follows:

"Its objects shall be: The professional improvement of its members, the encouragement of social intercourse among men of practical science, the advancement of engineering in its several branches, and the establishment of a central point of reference and union for its members."

Now, it may be a matter of opinion just how much "intercourse among men of practical science" is to be encouraged by embracing in the list of the Society's members young men eighteen to twenty-seven years of age; but as "men of practical science" must pass the years included between these limits, it is difficult to imagine why intercourse among them to some extent would not be encouraged in the contem-

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plated grade, except the Society lack capacity for such encouragement, or unless the man of science begins to be practical only at the age of twenty-seven or at some later period. But probably no one would admit either of these alternatives. Few are the engineers who do not begin their practical career at or before the age of twenty-one, and it is not difficult to find engineering students who use a considerable percentage of their time in practice at the age of eighteen.

Nor, I believe, can it be fairly denied that the proposed grade would advance engineering in its several branches, which the Constitution states as the third object of the Society. Any action by which young men who are preparing, or have prepared themselves to practice engineering in its several branches are brought in agreeable contact with older members of their chosen profession, will tend to give them a peculiar equipment for their duties which they could scarcely otherwise acquire. The growth of technical ideas will be more healthy, a better judgment will be developed and a stronger common sense, besides that finish and cultivation of the individual which contact with mature professional men is sure to confer on those of less experience. Such benefits enjoyed by those who are and are becoming engineers cannot fail to materially improve the quality of their work in after life when they reach positions of responsibility. Now, these same students will almost invariably become either members or associates; and let it be remembered that whatever improves the members of the Society vastly improves the Society itself. It would thus receive through a properly created grade of students constantly increasing benefits. A high professional tone or character in its individual members will enhance, in a multiplied degree, the position and influence of the Society as a body, and no means should be neglected to accomplish so desirable a result, so long as it is within the proper scope of the Constitution.

We are told that the Society is not an institution for primary education, which is unquestionably true, but has no proper bearing on the proposed amendment. If it is meant that the Society should divest itself of everything of an educational character, there will be little left worth saving. Of all the educational influences or forces valued and encouraged by the Society, that of experience is the greatest. When a man ceases to learn or be educated in the broad sense of the word, he ceases to live; from that time on he simply exists, exhausting his accumulated capital of experience and soon becoming a mental bankrupt in the activities of life.

Again we are told that the Society is an association of "skilled and experienced engineers," although the Constitution makes no such statement and has for many years provided for a class of young professional men whose experience and years are not sufficient to entitle them to the rights and privileges of full membership. Any such narrow and trade-like restriction savors altogether too strongly of the trade union to form

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a basis of action of a society of professional men. Broad principles, generous motives and high aim should characterize every feature of such an organization, and the statement derives emphasis from the success of the strongest engineering organization in existence at the present day.

The fact that young men would enter the grade of student with the desire to learn and the hope of benefit by association, is to my mind not only an argument for its existence, but a positive demand for its creation. If the Society could recruit its members from a body of young men actuated by an earnest desire to learn, and who had devoted years and means to the effort, and who are constantly moved to exertion by the hope of future benefit of association with those whose high principles and great success they emulate, I venture to say that its success would be far beyond that for which we now dare to hope. But aside from the bearing of this objection on the student grade, I believe it is safe to say that if the Society were to lose to-day all those who cherished a hope of future benefit by association when they joined, the honors of such an ideal membership would rest on the heads of an amazingly small number of individuals.

The grade of student, like all other grades, should be most jealously guarded, to the end that no unworthy applicant should enter. It seems to me that the age limits in the proposed amendment to Article XVI are judiciously placed; but I think the qualifications in the proposed amendment to Article XVII are much too low. At the end of the first year's study at a technical school, it is probable that a determination or real "intent" to pursue the study of engineering has been developed in a small minority of its students only. In the first-class technical schools of the country, probably not much more than one-third of those who begin the course of study pursue it to a successful termination, and few of the two-thirds who abandon it follow the business of engineering, and yet nearly all of those two-thirds complete the studies of the first year. I think, therefore, that the qualification should stand at least as follows: A student shall be one not less than eighteen nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an engineer, and who has pursued that study at a technical school not less than two years, and who, at the end of that time is in full standing in his studies; or one who shall have been engaged in the study and practice of engineering under a competent engineer for not less than three years, and who shall be subject to an examination at that time under the supervision of the Board of Direction.

I do not believe that anything less than this will assure that "intent to become an engineer," which the spirit of the amendment requires. The general character of the examination which would vary to some extent for different cases, could easily be prescribed.

Mr. Moore.—Mr. President, the amendment which I would offer is this:

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Associate Members who are not transferred to the grade of Members or Associates within ten years after admission as Associate Member shall cease to have any connection with the Society.

Mr. W. H. WHITE.—Mr. President, I think it is pretty clear that this thing will have to be revised in some fashion. I would move that the amendments be again submitted to the Committee, with instructions to revise and return them at the earliest possible future date.

Mr. CROES.—Mr. President, there is no use of discussing this suggestion; these amendments have to go out for ballot. Nothing that this meeting can do can prevent it.

Mr. WHITE.—Is that constitutional?

The PRESIDENT.—It is.

Mr. THEODORE COOPER.—The intent of Mr. White's motion can, and ought to be carried out; that after any amendments which may be offered at this meeting have been made, it will be well to refer the whole to some committee, so as to make them harmonious, this committee to report later in the day. It is impossible to adopt a number of individual suggestions as amendments, and have the whole thing harmonious and complete.

I therefore offer the following motion:

Resolved, That after the individual amendments are discussed and acted upon, a committee be appointed to take up the subject and put it in proper form and make it harmonious for presentation to this meeting at a later hour to-day, or at another session of this Annual Meeting.

This motion was carried.

Mr. A. M. WELLINGTON.—Mr. President, I believe Mr. Croes' motion is before the meeting. I sincerely hope that Mr. Moore's motion will not pass, for this reason: I am, myself, a great respecter of precedent. So long as we follow the Institution of Civil Engineers—which was the original of all Engineering Societies, which has been a most brilliant success, which has over 5 000 members, and has a higher standard of admission than any other Society—so long as we follow what they have done, we are, I think, safe; but when we depart very radically from what they have done, and make not only a grade of students, but a higher grade of Associate Members merely provisional, we are going too far beyond what that precedent would warrant, and venturing, I think, on dangerous grounds. There are very good reasons why a grade of students should be a temporary grade, from which a man drops if he is not admitted to the higher grades. He may, by the time he has reached the limits of age, abandon the profession altogether, and in that case it is not desirable that he should continue his connection with the Society; but when a man has reached a maturer age and becomes an Associate Member, I see no reason why he should not do so on a permanent basis, nor why he should be dropped altogether from the Society if he does not go higher than this after a certain number of years. We all know

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that there are engineers under the grade of Members, that there are many men in the Junior grade, who never rise to high positions, men who are excellent assistants, but who are not qualified to become Members, and never will be. It is not best to say to such men as these that they shall drop out of the Society altogether, although it is desirable that they should not be passed on to a higher grade.

While I am on my feet I will say a word with regard to another question. I have been gratified by part of what Mr. Cohen says; it illustrates the small ground for a great many of the objections to this proposed grade of students that have so far been brought forward. In establishing this grade it was proposed to follow exactly the precedent of the Institution of Civil Engineers. In that institution the grade of students is nearly as large as the grade of Members. The student grade during the past year numbered 934, while the Members were 1,581 in number, the Associate Members 2,340, and the Associates 475.

In the communications which have been read there have been repeated references to such statements as making the Society an organization for "infant baptism," "turning it into a Kindergarten," etc., etc. Unless they are prepared to make the same charges against the Institution of Civil Engineers, those gentlemen are displaying their own utter ignorance of the workings of that Institution. Does any one suppose that that is an organization for "infant baptism," or that their student grade is a "Kindergarten annex?" Another gentlemen points out that in the French and German Engineering Societies there are no grades corresponding to a student grade. Now, granting that for the sake of the argument, if we compare the French and German Societies with the English Institution, which is the one that this Society would most care to resemble? Certainly the Institution of Civil Engineers, which is a more weighty and influential body, perhaps, than all other engineering organizations put together. In England, every Engineer of any reputation belongs to the Institution of Civil Engineers; he cannot exercise any influence at all professionally unless he belongs to it, and I hope to see the same state of things in this country, that it will be a necessity for good professional standing to belong to the American Society of Civil Engineers. It is for that very reason that I desire and have advocated most heartily the passage of these amendments, because I think there should be an opportunity for every reputable young man, who desires the professional advantage which he may derive from the reading of our papers, etc., and the assistance which he may derive from having his name on our list of members, to be able to avail himself of these advantages. The latter object is a perfectly legitimate one; it brings a great many full Members into the Society, and I have no doubt it has a great deal to do with the students in England joining the Institution. You have only to take up any of the English Engineering journals and you will find plenty of young men who are in

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want of a position, stating in their advertisement that they are "students of the Institution of Civil Engineers." Why not? It speaks well for the young man in every way that he should belong to the Institution, and also, it shows that he has the qualifications necessary to get in.

The only other point that I desire to mention is in regard to the comments already alluded to, to the effect that "these privileges should be granted to every properly qualified and vouched-for applicant, who wants them and is willing to pay for them." There never has been in my mind any idea that the creation of a new junior grade of students would bring in any great amount of additional money to the treasury of the Society. The indirect benefit to the Society will, I believe, in many ways be great, but the proposition is not founded on any desire to increase the Society funds, nor is it fair to so represent it; but I say that any properly qualified young man who desires the advantage he may get from receiving our Transactions and from his connection with the Society should be allowed these privileges, both for the Society's sake and his own. I have myself had four or five applications from young men, desiring to know how they can become students of the Society. I simply answered these young men that the matter was to come up and be acted upon at this meeting. I am convinced that there is a considerable number of young men throughout the country who will gladly avail themselves of the privileges of the grade, if it is created; but if there be only one, why should the privileges be denied him? I certainly think, as I have said before, that we should for every reason be glad to give to "every properly qualified and vouched-for" applicant the scanty, yet to him important privileges, which it is proposed to give in this new grade, accompanied as it is by a needed and important increase in the qualifications for the higher grades.

Mr. D. FitzGerald.—Mr. President, I am one of those who believe that the proposed addition to the Society is an unnecessary one. We now have Members, Juniors and Associates, and the addition of this student grade is one that is not going to add honor to the Society or value to the new grade. There is one point on which I should like to be informed, and that is in regard to the necessity or advisability of changing our name of Junior to that of Associate Member. It seems to me a very objectionable change to make. The word "Associate," whether you couple the word "Member" with it or not, carries to the mind of almost everybody who is connected with the Society the idea of a non-professional member, and I think that the present designation of Junior is far preferable. I hope it will be retained. The very word "Associate" conveys the idea of a member who is not an engineer. I would like to hear the reason for making this change.

Mr. P. Roberts, Jr.—Mr. President, would it not be well to hear from some of the young men? I am not a young man myself, although a little younger than some of those who have gone before me. Mr.

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Wellington, who commences by saying, "It's English, you know," gives us a strong argument in favor of his views. In all that has been said by the members who are in favor of this amendment, we have had no objection from those members of the Society whom I may term the college professors. They, so far as I understand, are in favor of the proposed amendment.

Mr. CROES.—Mr. E. S. Philbrick is connected with the Massachusetts Institute of Technology, and Mr. D. M. Greene is the Director of the Rensselaer Polytechnic Institute of Troy.

Mr. P. ROBERTS, Jr.—These are the exceptions that prove the rule. I had so far heard no opinion as to this grade of students from our fellow members, the college professors. Now, I am well aware that a father has much pride in the advancement of his own children, and probably every member who is a father will remember the gratification he felt when his son had mastered the "*Pons Asinorum.*" So I think it is with much the same feeling of pride that the college professor would point to the student who had just read a most successful paper before the American Society of Civil Engineers. As a young man I remember very well with what pride I became a Junior of this Society, and after that a Member of the Society. I think a young man will work a little harder to become connected with the Society if he must show some record before he becomes one of us.

As to the matter of obtaining the Transactions, I doubt if there is such a great desire for these among college students. I confess, as a college boy myself, I would not have paid much for them. They can be consulted now in the libraries of most of our colleges, and they are thus within the reach of all those who may desire them.

Mr. FITZGERALD.—I move an amendment to the motion: that Associate Member be changed to Junior. I move this as an amendment to Mr. Moore's motion.

The SECRETARY.—Mr. Moore's motion is, that, Associate Members who are not transferred to the grade of Members or Associates within ten years after admission as Associate Member, shall cease to have any connection with the Society.

Mr. FITZGERALD.—I withdraw my motion for the present.

The question was then put upon the motion of Mr. Robert Moore, and the motion was declared lost.

The tellers then reported the result of the canvass of the ballot for officers as follows:

Total number of ballots received		272
Deduct without signature	2	
Voted a blue list	2	
Voted an annual meeting circular	1	
	—	5
Total ballots counted		267

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For *President:* Mr. Thomas C. Keefer received 264; for *Vice-Presidents:* Mr. J. James R. Croes received 261; Mr. Robert Moore received 267; for *Secretary and Librarian:* Mr. John Bogart received 258; for *Treasurer:* Mr. George S. Greene, Jr., received 263; for *Directors:* Mr. Alphonse Fteley received 267; Mr. Charles B. Brush, 266; Mr. Stevenson Towle, 263; Mr. Joseph M. Wilson, 262; Mr. Mendes Cohen, 261.

A recess was then taken for lunch.

The session was resumed in the afternoon, Mr. WILLIAM G. HAMILTON, Director of the Society, in the chair in the temporary absence of the President.

The President elect, Mr. THOMAS C. KEEFER, was introduced by the Chair, and made a short address.

The discussion of proposed amendments was resumed.

Mr. C. B. BRUSH.—Mr. President, as I understand the method in which this discussion is being followed, we are to propose amendments and then discuss them. If that is so, I propose an amendment:

That all reference to student membership be stricken out from the amendments, and also, that the term, "Associate Member" be stricken out, and the term, "Junior" be restored, as at present.

Mr. Brush's motion was seconded.

Mr. BRUSH.—This motion having been seconded, I will proceed with the discussion.

The statement has been made that college professors have not expressed themselves clearly and definitely upon this subject. I have the honor of being a college professor, having been for fourteen years connected with the School of Engineering of the University of the City of New York. At the same time I have had the honor of being an active Civil Engineer for the past twenty years, and can speak in both capacities. These amendments, I am quite confident, will be of very little practical advantage to the Society, if passed; but what I wish to speak of is their relation to the students themselves.

Every advantage that a student can receive by reason of these amendments is stated here in the amendments; he "shall have the right to use the library and rooms of the Society, and to attend its meetings, subject to such regulations and restrictions as the Board of Direction may adopt."

The difficulty with a student is, as has already been stated, that he has an entirely too exalted idea of himself and of his knowledge of the profession, and it is absolutely essential that clearer views of life and truer views of his relation to the profession should be presented and inculcated in the minds of these students, and until that is done the student is not receptive. Now, I do not imagine that every student with whom I have come in contact is in the course of time to become so qualified in his profession as to become a Member of this Society; and if this student membership can be obtained with so little work as is provided here, the honor of a connection with the Society will most certainly diminish in his eyes.

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Again, it is a matter of fact that the Transactions of this Society are to be found in the library of nearly every technical school in this country, and any student who can appreciate these Transactions can obtain access to them without difficulty at the present time. Any student who is a resident of the City of New York, or who wishes to consult the library of this Society, can do so by simply presenting a letter of recommendation to the Secretary, stating that the student is worthy of commendation, and asking the privilege of allowing him to consult the works on any subject that he may wish to consider. So that any one who desires may obtain these privileges without interfering with the rules of the Society.

In other words, the higher the standard, the more work the student will accomplish in order to reach that standard. If you lower the standard, the student himself will suffer.

One difficulty we have in all our technical schools is that too much is given the student to digest; he cannot digest what is given him. I think if we took a less number of studies and confined ourselves more to showing the student everything that was to be shown in them that he could grasp, the student might be a more valuable man to himself and to the Society. There are few of these papers that the student can really grasp; many of them are such as can only be understandingly read and appreciated by the practical engineer. And the professor always calls the attention of the student to such papers as may be of benefit to him, and points out such salient points as would escape the attention of the student alone. I think, from all points, the passage of this amendment would be an injudicious measure.

In relation to the other question, the class of Associate Member, I agree with what has been said that the term Junior conveys the idea of the grade of membership very much more clearly than the word Associate or Associate Member.

I am sure that the feeling which some of the members have expressed this morning, that the college professors were in favor of these amendments, is a mistake. I have had the pleasure of conversing with Professor Beardsley, a professor of Swarthmore College, in relation to the effect on the students themselves, and he thinks with me that it would not be good.

Mr. M. Cohen.—Mr. President, I myself have thought that there was no occasion for this change in the Constitution, and that there was no necessity for the introduction of a new grade. There has been, however, a considerable difference of opinion on this subject, and inasmuch as we have with us to-day as a guest, a member of the Institution of Civil Engineers, who has passed through the various grades of Student, Associate Member and finally Member—I refer to Professor Bovey, of McGill College, Canada—and I think that if he would favor us with some practical demonstration of the workings of this grade, and

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the progress through the several grades of membership, it would be very valuable to us.

The CHAIR.—We would be very glad to hear from Professor Bovey.

Professor H. T. BOVEY.—I very much appreciate your kindness in asking me to give you my experience in this matter, although I had hoped to be only a listener to the very interesting discussions which have been going on.

I think there must be a great deal of misapprehension as to the workings of the student class in the English Institution. It is not at all necessary, in the first place, that a student should be apprenticed to a civil engineer; even while at college a young man may become a student of the Institution of Civil Engineers. I am a Cambridge man myself, and as soon as I left the university I became a student, without any qualification, except that I had a pretty good education and also had the intention of becoming a civil engineer. Afterwards I was apprenticed to the chief engineer of the Mersey Docks. During the time I was a student I derived the utmost advantage from being a student of the Institution, and the feeling among the great body of students is that they derive great and lasting advantages from being connected with the Institution. They have nothing to do with the Institution as members, they are merely students, and they are enabled by their connection with the Institution and by securing the Transactions, to obtain as much knowledge as they can digest of the practical experience of the working engineers. Every young fellow, every pupil of an engineer, as soon as he becomes a pupil, makes it a point to join the Institution; and all the chief engineers, all the engineers who hold the highest positions, invariably recommend their pupils to become students of the Institution, feeling that they will derive great advantages from this connection. I speak myself as a former student, and I think that possibly the advantage to non-residents may be just as great as to residents. They are sometimes located in distant parts of the empire, and so have great satisfaction during their absence in the knowledge that they will receive the Proceedings of the Institution as soon as they are published, and thus become well informed of all that is going on in engineering work.

I do not think the Institution at home has ever considered any direct advantage that might be derived from such a connection; they considered only the advantages it would confer upon the profession as a whole, and I have no doubt but that view would obtain just as strongly on this side of the water. Every engineer, every working engineer, wherever he is, is desirous of raising the standard of the profession as high as possible. How is that to be done? Are we to say to these young fellows who are getting a fairly good education and training, are we to say that they shall have no connection with an institution in which the practical experience of their elders is given, and no opportunity of attending the

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meetings by which they might obtain a large amount of experience? Are we to exclude them from these advantages simply because they thus far have had no practice? I maintain that those students who cannot attend the meetings become very theoretically educated, and have, perhaps, a somewhat exalted idea of their own knowledge of the profession. Now, as soon as they are brought into contact with the views of practical experienced engineers, they begin to modify their own views a great deal, and the sooner those views are modified the better. How can you modify them better than by allowing these young men to come in and see where their views are harmonious with practice and where they are at variance with practice? If you allow them to come into the meetings, I do not think that you will ever find that they are too pushing or too ready to express their ideas; in fact, I think they are apt to be rather too modest; but, under any circumstances, they certainly modify their views very considerably. That was my experience. Before I had been connected with the Institution twelve months my views of the profession as a whole were very considerably changed.

A great deal has been said about the primary education of students. Well, I think if some of the Members would take the trouble to look into the Transactions of the Institution of Civil Engineers and just glance over some of the papers that have been written by students, they might modify their opinions on the subject. These papers are read by the students at their meetings. The meetings are presided over by a Member of the Council. Everything is conducted just as orderly and just as quietly as in the Members' meetings; the discussion goes on just as freely, and I think myself that some of the papers and discussions are very good. At the close of the discussions the whole proceedings are summed up by the Member presiding.

The Institution at home does not depend upon, nor is there any thought of any direct advantage to be derived from the students. The first intention was to benefit the profession at large, to raise the standard of the profession, and the idea was that this could best be done by preventing the acquisition of false ideas in the minds of students, by connecting them with the Institution and by giving them the Transactions, and allowing them to come to the meetings. The Institution of Civil Engineers was never so successful as it is now, and it derives a great advantage from filling up its membership from the student class; every time a ballot is taken you will see that so many students are transferred to the higher classes of membership. The Institution must undoubtedly depend in the end upon the students, who will become the engineers of the country. No sooner does a student get into practice than he desires to become a full member; and the sooner he becomes a full member the better it will be for the Institution and for the profession at large.

As to the possible change from Junior to Associate Member, of

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course I am not qualified to speak, but I might perhaps say one thing. You all know how very much confusion there is as to University degrees of all kinds in Canada, and I believe, in the United States. We never know what a B.A. means or a Ph.D. means. One college would give a degree of Doctor of Philosophy for one class of attainments, and another for another. Now, I think it would be quite possible to harmonize all these titles, so that all over the world it would be known just exactly what qualifications at least a Member or an Associate or a student possessed. According to these amendments, if they were carried, there would be a perfect harmony of requirements and titles over the whole English-speaking race, and that, I think, would be a vast advantage, especially for the profession.

If a man were an Associate Member, they would know just what qualifications he possessed which qualified him as an Associate Member, and I think it would be a great advantage if we could only fix upon some classification which every engineering institution would adopt. So far as the Associate Membership class in England is concerned, there were originally but three classes. When I joined the Institution as a student there were but the three classes: Member, Associate and Students. Then, when they began to elect men who were not engineers to the class of Associate, the associate membership rebelled, and several of them wrote to the council saying that if this were not altered they would leave in a body. The council considered the question, and decided to form another class, that of Associate Member. Those associates who wished were all transferred to Associate Member. This has always worked harmoniously, and there has never been any question of opposition.

Mr. E. S. Gould.—Mr. President, I merely wish to ask the Professor if the student class in the Institution are allowed to discuss the papers written by Members?

Professor Bovey.—Any student at the meetings of the engineers can get up and discuss these papers, but, as a rule, they don't take advantage of this privilege.

Mr. Gould.—You spoke of students' meetings?

Professor Bovey.—The students' meetings are attended by the students. Papers are presented and discussed by these students. Sometimes two or three members of the council or members of the Institution sit upon the platform, and the whole proceedings are summed up by the presiding officer, who is generally a member of the council.

Mr. D. FitzGerald.—I have listened with a great deal of interest to the very admirable statement that has been made, but it seems to me that these organizations are not exactly similar, when the circumstances in our country are fully considered. I can well understand how the students in London may get great benefit from their association with the parent society, but we must take into account that here there are local societies which contain, practically, a large part of what would be the

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student class. In these local societies they have the benefit of meeting and exchanging views, and of obtaining that intellectual food which it is supposed they would get from this Society if they were student members. The only further benefit that I can see is that they would receive our Transactions. But I do not think that we would care particularly to sow our publications broadcast over the country to men who are not with us as Members.

Professor BOVEY.—I think, Mr. President, that the cases are similar rather than different. We have a very large number of local societies in England, which do not conflict in the least with the parent society. There are local societies in Liverpool, Manchester, in fact in all the large cities. So far from conflicting with, I think they add to the standing of the mother institution. I was myself very intimately connected with the founding of the Liverpool society. There were several young fellows in Liverpool who could not always go up to London to attend the meetings of the Institution, and we thought it would be a very nice thing if we could form a society among ourselves; but never for a moment dreamed of lessening our connection with the mother society. Several of us met together and we formed what is now known as the Liverpool Society of Civil Engineers. I do not think that any local members are not members of the mother institution. I think that the formation of these local societies would not interfere with the benefits or advantages or workings of this Society. I think this great Society, and I presume the whole American profession represented by this Society, desire to promote the interests of the profession of engineering as much as possible.

Mr. CHARLES B. BRUSH.—I now formally offer the following amendment to the proposed amendments:

Resolved, That there be stricken out from the proposed amendments all those portions which refer to the creation of a grade of students.

This motion was seconded, and carried by a rising vote of 30 to 21.

Mr. THEODORE COOPER.—I consider that this amendment is not pertinent to the original proposed amendment.

Mr. J. J. R. CROES.—It seems only proper that this matter should be decided by the whole Society, and not by action taken at this meeting.

Mr. CHARLES B. BRUSH.—I did not have any intention of preventing an expression by the whole Society. If that is the result of the passage of my resolution I shall move to reconsider the vote.

The CHAIR.—If the resolution offered by Mr. Brush stands, then the Society at large will not have an opportunity to vote upon the question of establishing a student grade.

The motion to reconsider was put and declared carried.

The CHAIR.—The question now is upon the adoption of the amendment offered by Mr. Brush, as follows:

Resolved, That there be stricken out from the proposed amendments all those portions which relate to the creation of a grade of students.

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Mr. THEODORE COOPER.—I make the point of order, that this amendment is not pertinent to the amendment as originally proposed, and is therefore not in order.

The CHAIR.—The chair decides that any amendment which neutralizes the amendment as originally proposed is not a pertinent amendment, and that therefore this amendment is not in order.

Mr. M. COHEN.—I would like to ask a question. As I understand it myself, we cannot strike out the enacting clause of the amendment, and it must come before the Society for ballot. If a resolution be in order that would call for the appointment of another committee to consider this subject and report to the Society in order that the advice and deliberations and suggestions which may be arrived at by that committee might accompany the form of letter-ballot, if that would be in order I would offer some such resolution. The reason for that is this: It appears to me that this meeting is scarcely prepared to indorse the suggestions of those amendments just as they now stand; they cannot be neutralized; and while it would appear that there are many arguments in their favor, still this particular time is not the most proper for carrying them out. Now, in allowing these amendments to go to ballot it might be well to have a committee appointed, which might bring out an intelligent vote from the Society, and would present the expressions brought out at this particular time. That is the object, and if it is proper, I will, as I say, offer some such resolution.

Mr. A. M. WELLINGTON.—I do not understand that there is any such power whatever. We can amend this at this meeting, but there is no possible opportunity for the appointing of another committee or for doing anything whatever except to amend these amendments at this meeting and send them out for vote. Constitutionally we can do nothing but amend these and send them out for vote.

A MEMBER.—Would it be proper to express, in connection with the letter-ballot, the sense of this meeting, where we have heard the various changes *pro* and *con* discussed; would it be improper to express that the sense of this meeting was against the addition of the student grade? Might the present meeting be regarded as a committee of the whole Society for considering the arguments *pro* and *con*, and that their judgment was against it?

Mr. COOPER.—These amendments must be recommended or disapproved at this meeting, that they may be sent out.

Mr. CROES.—Mr. Cooper is slightly in error in that respect. This meeting is not obliged to recommend an amendment in order to get it before the Society. "It shall be sent out with such amendments as may be adopted at the Annual Meeting." With regard to the other question raised this discussion will be printed and sent out before the ballot is taken, so that every one will have an opportunity to vote intelligently upon the subject, if he have any intelligence at all.

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If the amendments in this form are not adopted, it can be revised in such form as this discussion and the further discussion upon it will lead to, in time for the next Annual Meeting. There is no such terrible hurry about this; it is hardly necessary to the life of the Society that this amendment should be adopted this year. Let us have a good square vote on this question; any five members can bring it up again next year and we can fight it all over again.

Mr. FITZGERALD.—I don't desire to prolong this discussion, but I would like to ask if it is in order to pass the following resolution:

Resolved, That it is undesirable to amend the Constitution at the present time by adding the student class.

Gen. G. S. GREENE.—I want to ask if it is in order to appeal from the decision of the Chair on this question that has just been decided as to the propriety of striking out all reference to students where it may occur in the amendments. It appears to me nothing is more clear than that to strike out these words is pertinent to this question, and that the ultimate view is to consider whether it is within the working of the Constitution.

The CHAIR.—It is entirely in order to appeal from the decision of the Chair. The question is, shall the decision of the Chair be sustained?

A resolution was offered striking out from the proposed amendments all reference to the student class. A point of order was made that such an amendment was not pertinent to the original amendment. The Chair ruled that such an amendment was not pertinent to the original amendment and was not in order, and the question now is, shall the decision of the Chair be sustained?

A vote was taken and the decision of the Chair was sustained.

Mr. FITZGERALD.—I offered a resolution a moment ago:

Resolved, That it is the sense of this meeting that it is undesirable to amend the Constitution at the present time by adding a student class.

This resolution was seconded and carried.

Mr. E. S. GOULD.—I offer another resolution:

That the sense of this meeting is against the change of title from Junior to Associate Member. That the sense of this meeting is that the term Junior be retained.

This motion was seconded and carried by a standing vote of 35 to 10.

Mr. J. P. DAVIS.—I do not see that that resolution affects the matter at all; this vote has no effect whatever.

Captain O. E. MICHAELIS.—I think that the motion which has been carried conveys to the members who have not been present to-day that the sense of the meeting is against the proposed change, and that is what they wish to be informed of.

The SECRETARY.—Mr. President, the amendments "A" upon the

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circular have now been discussed by the Annual Meeting. Before passing to another amendment I would ask if there is anything further to be done with these amendments.

Mr. FITZGERALD.—I have offered an amendment which was merely postponed; that

Wherever in these amendments the words Associate Member is used it be stricken out and the word Junior be put in its place, and that the last clause of Article XVI be struck out.

This amendment was seconded and carried by a rising vote of 34 to 9.

It was, on motion,

Resolved, That Amendment marked *B* be submitted without amendment to the Society for ballot.

It was, on motion,

Resolved, That Amendment marked *C* be submitted without amendment to the Society for ballot.

The following resolution was offered:

Resolved, That it is the sense of this Annual Meeting that the amendment marked *D* should not be adopted.

This motion being seconded, was carried by a rising vote of 44 to 4.

It was, on motion,

Resolved, That the consideration of an amendment to the By-Laws which had been proposed should be postponed till the result of the letter-ballot on amendments to the Constitution should be known, as the amendment to the By-Laws was entirely contingent on the amendments to the Constitution.

The report of the Committee on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry was presented verbally by Mr. F. COLLINGWOOD, chairman of the Committee.

On motion, the report was accepted and the Committee continued.

Under the resolution previously adopted, Messrs. THEODORE COOPER, A. M. WELLINGTON, ROBERT MOORE, JOSEPH P. DAVIS and CHARLES B. BRUSH were appointed the Committee to put into proper form the amendments to the Constitution, making necessary verbal changes in accordance with the amendments as proposed and as amended by this meeting. The Committee to report at an adjourned meeting to be held Thursday evening.

Mr. R. HERING offered the following resolution:

Whereas, It is deemed highly desirable by the engineering profession that better information should be collected than is now available regarding the intensity of rainfalls in different sections of the United States, particularly with reference to the practical questions involved in the construction of works for water supply and sewerage; and

Whereas, It is entirely feasible for the Signal Service Bureau to obtain such information without increase of force, but simply by the erection of automatic self-registering rain gauges in addition to those now employed; therefore,

Be it Resolved, That the American Society of Civil Engineers respectfully urges upon Congress the desirability of inserting in the next annual

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appropriation bill for the Signal Service Bureau an item sufficient to cover the expense of placing automatic rain gauges at all principal stations as the Chief Signal Officer may direct;

Resolved, further, That a committee of three be appointed to urge this matter upon Congress and the appropriate committee.

The resolution was seconded, discussed and adopted.

The following members were appointed the committee under the above resolution: Messrs. RUDOLPH HERING, DESMOND FITZGERALD and DAVID E. MCCOMB.

The Annual Meeting then took a recess till the evening of Thursday, January 19th, 1888.

JANUARY 19TH, 1888.—The session of the Annual Meeting was resumed at 20 o'clock. The committee appointed to put in shape for letter-ballot the proposed amendments to the Constitution reported those amendments as follows:

PROPOSED AMENDMENTS.

A. 1.—Amend Article XVI of the Constitution by substituting for the present Article the following:

Article XVI.

The active membership of this Society shall be divided into three classes, to be styled respectively Members, Juniors, and Associates; and each person, when duly elected and qualified, shall receive a certificate of membership indicative of the class to which he belongs.

Juniors shall have all the rights and privileges of Members, excepting the right to hold office or to vote upon admission to membership or changes in the Constitution and By-Laws of the Society. Associates shall have all the rights and privileges of Members, excepting the right to hold office or to vote.

There shall also be a preparatory grade, to be designated Students of the Society, who shall have the right to receive the Transactions of the Society and to present papers and written discussions. They shall also have the right to use the library and rooms of the Society, and to attend its meetings subject to such regulations and restrictions as the Board of Direction may adopt.

2.—Amend Article XVII of the Constitution by substituting for the present Article the following:

Article XVII.

A Member shall be a Civil, Military, Mining or Mechanical Engineer, not less than thirty years of age, who has been in active practice as such for at least ten years, or has graduated at a school of engineering and been in practice seven years, and who has had responsible charge of work as Chief, Resident or Superintending Engineer for at least two years, not as a skillful workman merely, but as one qualified to design, as well as to direct, engineering works.

A Junior shall be one not less than twenty-four years of age, who has had actual practice in some of the branches of Civil, Military, Mining or Mechanical Engineering for at least five years, or has graduated at a school of engineering and been in practice two years, and who continues in actual practice at the time of his application for membership.

An Associate shall be one not less than twenty-five years of age, who

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is a manager of a railroad, canal or other public work; a geologist, a chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit, qualifying him to co-operate with engineers in the advancement of professional knowledge, but shall not himself be practicing as an engineer.

A Student shall be one not less than eighteen, nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an engineer and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent engineer for not less than two years. A student may remain as such for seven years, or until attaining the age of twenty-seven years, when his connection with the Society shall cease, unless elected to a higher grade.

3.—Amend Article XVIII of the Constitution by substituting for the present Article the following:

Article XVIII.

Applications for admission to any grade of the Society, whether by transfer or otherwise, shall contain a statement, over the candidate's signature, of his age, residence, nature and term of his professional service, and that he will conform to the requirements of membership if elected. Fellows shall not be required to present themselves as candidates; those making the nomination shall state the ground therefor, and certify that the nominee will accept if elected.

Applications for admission as student must be endorsed by some one member or associate, and for admission to any other grade by at least five members, who certify in each case that they personally know the candidate, and that he is worthy of acceptance.

In case of transfer from one grade to another, the candidate shall be required to pay as entrance fee to the higher grade the difference between the entrance fees of the two classes.

4.—Amend Article XIX of the Constitution, by substituting for the present Article the following:

Article XIX.

The election to the grade of student shall be by the Board of Direction, and one negative vote shall exclude.

The election for all other grades, after approval of the application by the Board, shall be by letter-ballot, which shall be canvassed at the next regular meeting held after twenty-five days have elapsed from the time of mailing the ballot lists. Five or more negative votes shall exclude. In case of the non-election of any candidate no notice thereof shall be taken in the proceedings or minutes.

5.—Amend Article XXVIII of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XXVIII.

Upon the written request of ten or more members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been

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tendered, or a satisfactory defense made, will then notify the member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall, in any event, be the only public announcement of the matter. A student may be summarily expelled at any time by a majority vote of the Board of Direction.

B.—Amend Article XVIII of the Constitution by inserting after the word "*acceptance*" the following:

"Proposals for admission to the Society, of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance."

C.—Amend Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

D.—Amend Article XIX of the Constitution by substituting for the whole Article the following:

Article XIX.

Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for no notice shall be taken thereof in the minutes.

The report of the committee was accepted, and it was directed that the amendments should be issued in the above form for letter-ballot.

The Annual Meeting then adjourned.

On the evening of Wednesday, January 18th, a paper on the Panama Canal in 1887 was read by Lieut. C. C. Rogers, U. S. N.

On Thursday, January 19th, a visit was made to the bridge in progress of construction over the Harlem Valley (two steel arches of 510 feet span each, and seven granite arches of 60 feet span each).

On Thursday evening a reception was given at the Society House.

The members of the Society, of the various classes, 176 in number, present at the annual meeting, excursions, etc., were: Charles Ackenheil,

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John W. Bacon, William H. Baker, Frederick H. Baldwin, Arthur Beardsley, Leonard F. Beckwith, Henry A. Bentley, John A. Bensel, George H. Bishop, H. Bissell, John Bogart, Alfred P. Boller, William F. Booth, W. A. Brackenridge, Henry R. Bradbury, P. F. Brendlinger, Josiah A. Briggs, A. G. Brinckerhoff, Henry W. Brinckerhoff, Charles O. Brown, Charles B. Brush, Andrew Bryson, William H. Burr, Frank A. Calkins, Robert Cartwright, S. H. Chittenden, Benjamin S. Church, D. D. Clarke, Mendes Cohen, F. Collingwood, Alfred G. Compton, A. N. Connett, Theodore Cooper, George B. Cornell, E. L. Cottrell, Joseph P. Cotton, J. James R. Croes, Joseph P. Davis, J. Woodbridge Davis, George Devin, P. P. Dickinson, Thomas Doane, S. B. Downes, Thomas Egleston, Charles E. Emery, John T. Fanning, John W. Ferguson, George S. Field, Clarke Fisher, Desmond FitzGerald, J. Foster Flagg, John D. Fouquet, George B. Francis, James B. Francis, Arthur J. Frith, A. Fteley, Charles E. Goad, Henry H. Gladding, Edgar B. Gosling, Wilbur F. Goodrich, E. Sherman Gould, Charles H. Graham, Samuel M. Gray, George S. Greene, George S. Greene, Jr., Stephen S. Haight, William G. Hamilton, Charles M. Harris, Robert L. Harris, Bentley D. Hasell, William J. Haskins, Arthur Haviland, G. F. Haynes, Rudolph Hering, Albert B. Hill, S. Willett Hoag, Jr., John Houston, E. W. Howe, W. M. Hughes, C. W. Hunt, William R. Hutton, C. E. Jackson, S. J. Johnson, William P. Judson, George A. Just, Walter Katté, Thomas C. Keefer, Cassius W. Kelly, G. Leverich, Gustav Lindenthal, A. W. Locke, D. Jones Lucas, Albert Lucius, William W. Maclay, Edward E. Magovern, Henry Manley, James R. Maxwell, Thomas C. McCollom, David E. McComb, T. H. McKenzie, Mansfield Merriman, Henry C. Meyer, Thomas C. Meyer, O. E. Michaelis, J. Albert Monroe, Robert Moore, S. Fisher Morris, James Moylan, Charles H. Myers, O. F. Nichols, Willard A. Nichols, George B. Nicholson, Edward P. North, F. O. Norton, Albert F. Noyes, Fred. S. Odell, L. F. Olney, James Owen, A. B. Paine, William H. Paine, William Barclay Parsons, George H. Pegram, P. A. Peterson, Edward F. Playle, Arthur Pou, Robert J. Pratt, Samuel Rea, Benjamin Reece, George S. Rice, Palmer C. Ricketts, Percival Roberts, Jr., William Roberts, G. M. Rusling, J. Gardner Sanderson, John S. Schaeffer, C. C. Schneider, Henry B. Seaman, Granville W. Shaw, William P. Shinn, Frank W. Skinner, A. W. Smith, Miller A. Smith, Oberlin Smith, T. Guilford Smith, J. Parker Snow, Julio F. Sorzano, John H. Staats, Waterman Stone, W. A. Sweet, George H. Thomson, John Thomson, George C. Tingley, Calvin Tomkins, E. E. Russell Tratman, Alfred W. Trotter, Edgar B. Van Winkle, Downing Vaux, Yoshichika Wada, Lebbeus B. Ward, James R. Wardlaw, Albert L. Webster, A. M. Wellington, N. J. Welton, W. C. Wetherill, E. B. Weston, Thomas D. Whistler, W. Howard White, O. F. Whitford, Frank W. Whitlock, Frank O. Whitney, D. J. Whittemore, William H. Wiley, Joseph M. Wilson, Sebastien Wimmer, William E. Worthen, A. J. Zabriskie.

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OF THE BOARD OF DIRECTION.

JANUARY 4TH, 1888.—Applications were considered. The report of the sub-committee on Professional Training and Technical Education was presented. Arrangements for the Annual Meeting were considered. Appropriations were made.

JANUARY 11TH, 1888.—The Secretary presented final draft of the Annual Report, which was considered, amended and adopted.

JANUARY 19TH, 1888.—In accordance with the provisions of the Constitution, the following Standing Committees were appointed :

On Finance, Messrs. Stevenson Towle, Charles B. Brush and Mendes Cohen.

On Library, Messrs. J. James R. Croes, A. Fteley and Joseph M. Wilson.

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REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1887.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 18TH, 1888.

The Board of Direction, in compliance with the provisions of the Society law, presents its report for the year ending December 31st, 1887:

MEMBERSHIP.

As shown by the tabular statement hereinafter given, there has been, during the year, an addition of 116 to the various grades of Society membership. In this nominal addition of 116, there are two former Associates transferred to Members, and nine former Juniors, also transferred to Members; therefore the actual new additions to the Society membership during the year number 105.

The losses from the Society membership have been 14, being 11 by death and 3 by resignation. The number of persons now connected with the Society is 1 110, being greater by 91 than at the end of the previous year.

The actual net increase during the year, and present total in each class of membership, are:

Honorary Members, decrease during year.....	1	Total....	8
Corresponding Members.....		.....	3
Members, increase during year.....	78	Total....	838
Associates, " "	1	"	45
Juniors, " "	14	"	120
			1 014
Fellows, not included above, decrease	1	Total....	56
Subscribers to the Building Fund, not included above		"	40
Increase during year.....	91	Total....	1 110

Tables showing the classification of membership at the beginning of the year, and the changes during the year, are given at a subsequent part of this report.

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Annual Convention.

The Annual Convention was held at the Hotel Kaaterskill, Catskill Mountains, N. Y., July 2d, 4th, 6th and 7th, 1887.

The proceedings at the Convention have been published in detail in the proceedings for that month. Members of the Society assembled at the rooms on the evening of the 30th of June, and on the next morning, July 1st, proceeded by steamer up the Hudson River to Rondout, and thence, by rail, to the hotel. There was a large attendance at the Convention. A number of interesting papers were presented, and the discussions both on technical subjects, and at the business meeting, were animated. During the Convention visits were made to the bridge in progress of erection over the Hudson River at Poughkeepsie, and to the cement mines and works at Binnewater, Ulster County, N. Y.

The suggestions made by Members as to a desirable place for the next Convention, and an invitation which has been tendered to the Society, will be presented at the present meeting for your consideration.

Meetings of the Society.

Nineteen meetings of the Society were held during the year, one of which was the Annual Meeting, held in New York, January 19th and 20th, and another the Annual Convention, held at the Hotel Kaaterskill, New York, July 2d, 4th, 6th and 7th, all the sessions of the Convention, including the business meeting, being counted as one meeting of the Society. Meetings have been held on the first and third Wednesdays of each month, except July and August.

Thirteen meetings of the Board of Direction have been held during the year.

Light collations, provided entirely by subscription of Resident Members, have followed the Society meetings, and have given opportunities for conversation which have been appreciated.

Transactions.

The number of pages issued in the Transactions is now increasing to such an extent that it has been determined to make the volumes include six months, instead of twelve, as heretofore. This will make the Transactions much more easily bound and handled, as the 1 035 pages of last year were found to be too bulky for convenient reference and use.

The Society House and Building Fund.

At an informal meeting held at the Hotel Kaaterskill on July 4th, 1887, at which a number of members of the Society were present, the President, Mr. William E. Worthen, stated that the Society had grown to such an extent that the present house had become inadequate, particularly for the meetings, and for the convenient use of the library, and

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that it was of great importance to the welfare of the Society that something should be done either towards building an addition to the present house, or, if it were practicable, the purchase of larger and more commodious quarters.

The following resolutions were adopted:

Whereas, The accommodation of the present Society building is entirely inadequate for the purposes of the Society, and it is deemed advisable without delay either to provide new quarters or an enlargement of the present building;

Resolved, That the members and friends of the Society are urged to contribute to the Building Fund as they may be able in order that immediate measures may be taken by the Board to accomplish this object.

Resolved, That the Board, in its discretion, may expend a reasonable sum in an addition to the present building.

The sum of $5 225 was directly subscribed by gentlemen present; and subsequent subscriptions have been received, making the total amount $9 169.50.

The Board of Direction, in view of the extent of this subscription, and of the fact that it exceeded the amount estimated as necessary to make an enlargement of the present house, determined to appoint a committee with reference to ascertaining whether an amount could not be secured from among persons connected with engineering interests to warrant the purchase or erection of a larger building for the Society.

Subject of the Appointment of a Committee on Technical Education and Professional Training.

At the last Convention of the Society the following resolution was adopted:

Resolved, That the Board of Direction of the Society be requested to consider the advisability of appointing a standing committee on Technical Education and Professional Training, which should annually report to the Society the status and progress of such instruction in the United States, and Europe as well, together with such data, statistics and suggestions relative to the subject as may seem to them proper; said committee to co-operate with similar committees of other engineering societies, should such be appointed.

In discussing the proposition thus submitted to the Board, it is necessary to consider the aims and objects of the Society, and the proper scope of investigations which may be undertaken under its direction and at its expense.

Out of the infinite variety of subjects which interest civil engineers, it is evident that only a limited number can be critically examined and discussed by, and at the expense of this organization, which includes specialists in almost every branch of the profession. It appears to the Board that in selecting topics for discussion and papers for printing,

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preference should be given to subjects which will be of interest and profit to engineers who have had such experience and made such advances in their profession that they are qualified to criticise methods of overcoming difficulties and solving novel points of practice.

Whatever the ultimate scope of the Society's work may be, it must always be borne in mind that the object of its formation and the aim of its present existence is not primary education in science, but the higher education of skilled scientists.

As its funds available for the dissemination of scientific knowledge increase, opportunity will be afforded for extension of the scope of its publications, so as to include, possibly, the consideration of the best methods of primary education.

But at this time primary or rudimentary education is not its object, and will not be so long as it remains devoted to the objects and aims of its founders and, we believe, the great majority of its present members.

The Board does not consider it advisable, therefore, to take any action which would lead to the expenditure of the Society's funds in discussing the early education of engineers so long prior to the time when they can, under any circumstances, become members of the Society.

Amendments to the Constitution.

No amendments to the Constitution have been adopted during the year.

A number of amendments have been regularly presented and are before you for discussion and amendment at the present Annual Meeting.

The Norman Medal.

The Norman Medal for the year 1886 was awarded to Paper No. 318, "English and American Railroads Compared," by Edward Bates Dorsey, M. Am. Soc. C. E.

The Board of Censors to award this medal for the past year will present its report at the present meeting.

The Rowland Prize.

The Rowland Prize for the year 1886 was awarded to Paper No. 317, "The Cantilever Bridge at Niagara Falls," by C. C. Schneider, M. Am. Soc. C. E.

The Committee to award this prize for the past year will present its report at the present meeting.

Membership Tables.

The following tables show the changes and additions during the year in the various classes of membership:

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On January 1st, 1887, the date in the last report, the membership in the Society was :

Honorary Members, resident ...	3	Non-resident	6	Total ...	9
Corresponding Members	—	"	3	" ...	3
Members, resident	153	"	607	"	760
Associates, "	11	"	33	"	44
Juniors, "	25	"	81	"	106
					910
Making, resident	192	Non-resident	730		
Total					922
Fellows, 64, of whom 7 Members are included above, leaving					57
Subscribers to the Building Fund, 140, of whom 90 are entered in one or other of the above classes, and 10 deceased, leaving					40
Total connected with the Society, January 1st, 1887 ..					1 019

At the present date, January 1st, 1888, the membership is:

Honorary Members, resident ..	3	Non-resident	5	Total ...	8
Corresponding Members	—	"	3	" ...	3
Members, resident	168	"	670	"	838
Associates, "	11	"	34	"	45
Juniors, "	29	"	91	"	120
					1 003
Making, resident	211	Non-resident	803		
Total					1 014
Fellows 62, of whom 6 Members are included above, leaving					56
Subscribers to the Building Fund, 140, of whom 89 are entered in one or other of the above classes, and 11 deceased, leaving					40
Total connected with the Society, January 1, 1888					1 110

The additions during the past year to the several classes of Society membership have been :

Members qualified	86
Members reinstated	1
Associates qualified	3
Juniors qualified	25
Fellows qualified	1
Total additions	116

The decrease during the year in the several classes of membership has been :

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Honorary Members	Died	1			1
Members	"	6	Resigned	3	9
Associates			Transferred to Member		2
Juniors	Died	2	"	" 9	11
Fellows	"	2			2
Totals: Deaths 11, Resignations 3, Transferred 11					25

There has been an addition of 116 to the various classes of membership, and a decrease of 25, making the actual net additions during the year 91 in number.

On January 1st, 1887, there was, as stated in the last Annual Report, 29 proposals pending. One hundred and seventy-six proposals have been received during the year; 87 candidates have been elected Members, of whom 2 were transferred from Associate, and 8 were transferred from Juniors; 3 candidates have been elected as Associates; 28 candidates have been elected Juniors; 1 candidate has been elected a Fellow.

Eighty-six persons have during the year qualified as Members; 3 have qualified as Associates; 25 have qualified as Juniors; 1 has qualified as Fellow; 7 candidates elected during the year as Members, and 4 as Juniors have not qualified. There are 56 proposals now pending.

The Library has been increased during the year by the following additions:

Books and Pamphlets	526
Maps, Plans, Drawings, Charts, Photographs and Engravings	136

The Society has lost, by death, during the term covered by this report, six Members: Messrs. JAMES B. EADS, Past Vice-President, and who was also a Fellow of the Society and a Subscriber to the Building Fund; F. W. VAUGHAN, Past Director of the Society; WILLIAM W. WILSON, EUGENE F. FALCONNET, SULLIVAN HASLETT, STEWART DERBISHIRE; 2 Juniors: Messrs. A. J. STAHLBERG and FRANK BERESFORD; 2 Fellows: Messrs. FREDERICK KRUPP and ALEXANDER MITCHELL.

Respectfully submitted,

For the Board of Direction,

JOHN BOGART, *Secretary.*

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REPORT OF THE TREASURER FOR THE YEAR ENDING DECEMBER 31st, 1887.

RECEIPTS.

Balance on hand December 31st, 1886:				
Building Fund			$100 00	
General Funds			3 838 02	
				$3 938 02
Entrance Fees			$2 875 00	
Current Dues:				
From 102 Resident Members	$2 432 50			
" 506 Non-resident Members	7 292 26			
" 7 Resident Associates	97 50			
" 16 Non-resident Associates	160 00			
" 14 Resident Juniors	195 00			
" 67 Non-resident Juniors	625 00			
		$10 802 26		
Past Dues:				
From 12 Resident Members	$317 50			
" 38 Non-resident Members	667 50			
" 1 Resident Associate	30 00			
" 2 Non-resident Associates	30 00			
" 3 Non-resident Juniors	25 00			
		1 070 00		
Dues for year beginning January 1st, 1888:				
From 23 Resident Members	575 00			
" 41 Non-resident Members	615 11			
" 3 Non-resident Associates	30 00			
" 2 Resident Juniors	30 00			
" 4 Non-resident Juniors	40 00			
		1 290 11		
			13 162 37	
From sales of Publications		.....	780 07	
" Certificates of Membership		.....	126 00	
" Advertisements		.....	429 75	
" Interest on Fellowship Fund Bonds		$480 00		
" " Savings Bank Deposit		19 30		
" " Norman Medal Fund		70 60		
" " Rowland Prize Fund		60 00		
" " General Fund Stock		40 00		
" " General Fund Bonds		60 00		
" " Compounding Fund Bonds		60 00		
			789 30	
From Fellowship Fees		.....	150 00	
Subscriptions to Fund for Enlarged Building		.....	6 169 50	
Compounding Payments		.....	500 00	
Other sources		.....	4 30	
				24 986 29
				$28 924 31

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DISBURSEMENTS.

Interest on Mortgage	$800.00	
Taxes	471.15	
Publications	8 069.30	
Stationery and Printing	970.90	
Postage	1 355.43	
Library	797.37	
Salaries	3 000.00	
Convention and Annual Meeting	1 597.95	
Janitor, House Supplies, Fuel, Water and Gas	1 867.78	
Certificates of Membership	58.25	
Insurance	244.63	
Norman Medal and Rowland Prize	120.50	
Finance—Treasurer's Books, General Accounts—Collections	1 100.00	
Work on Committees	370.00	
From Building Fund—Permanent Repairs	100.00	
Other Expenditures	441.23	
		$21 364.49
Purchase of Bond, Building Fund		1 035.00
		$22 399.49
Transferred to Savings Bank		19.30
Balance on hand:		
Building Fund	$5 134.50	
General Funds	1 371.02	
		6 505.52
		$28 924.31

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The funds of the Society are as follows:

Fellowship Fund:	
Ninety-one subscriptions to December 31, 1886.....	$9 800.00
Premium and accumulated interest December 31, 1886	1 388.28
Fund on hand December 31, 1886.....	$11 188.28
One subscription during 1887.....	150.00
Interest received during 1887.....	534.87
	$11 873.15
Expended for publications during 1887.....	534.87
	$11 338.28
The present investment of the Fund is:	
Nine Pennsylvania Railroad General Mortgage Six per cent. Bonds, cost.....	$11 111.82
Portion of deposit in Seamen's Bank for Savings.....	226.46
	$11 338.28
Norman Medal Fund:	
One Certificate Croton Aqueduct Stock, New York City.....	$1 000.00
Building Fund:	
Receipts previous to December 31, 1885.....	$17 842.00
Expended:	
For Legal Services, Circulars, etc.....	355.03
For Improvements on Property.....	3 486.97
Payments on Purchase.....	14 000.00
	$17 842.00
Fund for Enlarged Building:	
Receipts.....	$6 169.50
This fund comprises:	
Cash.....	$5 134.50
One Chicago and Northwestern Railroad 5 per cent. Bond, cost.....	1 035.00
	$6 169.50

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Rowland Prize Fund:

One Pennsylvania Railroad General Mortgage Six per cent. Bond, cost	$1 222.50

General Investment:

Ten Shares Stock Consolidated Gas Company of New York, cost	$972.50
Portion of one Pennsylvania Railroad General Mortgage Six per cent. Bond	222.50
Portion of deposit in Seamen's Bank of Savings	758.10
	$1 953.10

Compounding Fund:

Four single payments for compounding dues	$1 000.00

The present investment of this Fund is:

Portion of one Pennsylvania Railroad Six per cent. General Mortgage Bond	$1 000.00

Respectfully submitted,

G. S. GREENE, Jr.,
Treasurer.

REPORT OF THE COMMITTEE ON FINANCE.

NEW YORK, January 17th, 1888.

The Finance Committee have the honor to report that they have performed the usual duty of auditing all the bills which have been paid by the Treasurer during the past year, and have found that each bill has been charged to its proper fund, and that the several sums have not exceeded the amounts appropriated by the Board of Direction for the purposes specifically mentioned. Also that the Committee has, at the end of the year, carefully examined all the assets of the Society, and has found that the reports of the Secretary and Treasurer give a correct account of the same.

WILLIAM G. HAMILTON,
Acting for Finance Committee.

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REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 18TH, 1888.

The Special Committee on Uniform Standard Time have the honor to report that there has been a steady if not marked progress in the time reform movement during the past year.

At the last Annual Meeting it was announced that the 24-hour notation had been introduced for use on the Western and Pacific Divisions of the Canadian Pacific Railway, embracing with branches and connections, 2 600 miles. In January last the new notation had been in practical use for over six months and the Vice-President of the company had placed at the service of the Committee a large number of letters received by him from the principal officers, from the Lieutenant-Governor of Manitoba, from the Mayors of cities and others, all testifying to the advantages resulting from the change. These various documents, together with the report of this Committee, were printed in pamphlet form and sent to members of the General Time Convention for their information. A Special Committee of that association at the same time issued a circular drawing attention to the pamphlet and submitted a series of questions to which they invited replies.

The General Time Convention met on the 13th of April last in New York, when the replies received were reported and of which the following is a

SUMMARY.

QUESTION No. 1.—Are you in favor of the general adoption of the 24 o'clock system of counting the hours—abandoning the use of A.M. and P.M. ?

REPLIES.—Affirmative—	61	railways.....	35 645 miles.
Negative—	38	"	26 572 "
	99		62 217 "

QUESTION No. 2.—Are you willing to adopt this system for use on your employees time-table, provided your connecting lines will do the same ?

REPLIES.—Affirmative—	76	railways.....	47 004 miles,
Negative—	21	"	20 109 "
	97		67 113

QUESTION No. 3.—Do you consider it necessary that you should be assured that the people along the line of your road will adopt the 24 o'clock system (so you can use it for advertising your time) before you will be willing to adopt it for your employees time-tables?

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Replies.—Affirmative—	37	railways.....	22 529 miles.
Negative—	49	"	26 110 "
	86		48 639 "

Question No. 4.—Do you believe the people, generally, in your vicinity, will readily adopt the system if it is adopted by the railway companies?

Replies.—Affirmative—	25	railways.....	11 436 miles.
Negative—	49	"	34 594 "
	74		46 030

Question No. 5.—Do you believe it to be practicable to bring about the change at the present time?

Replies.—Affirmative—	38	railways.....	25 435 miles.
Negative—	44	"	33 843 "
	82		59 278 "

This expression of opinion from so practical a body is of great value. It shows that they are nearly equally divided with respect to an immediate change, those of the negative opinion slightly preponderating. The replies to Question No. 2 are the most important and encouraging. They establish very clearly that from 78 to 79 per cent. (of all the railways heard from) are willing to adopt the 24-hour notation for use in the operating of the roads, provided the connecting lines will do the same.

During the past year the new notation has been continued on the Canadian Pacific Railway with assured favor, and the company is so well satisfied with the advantages of the system that they intend extending it as soon as it can be conveniently done. Since mid-summer last it has been employed on the line owned and operated by the Canadian government from the City of Quebec to Halifax, in Nova Scotia. Mr. C. Schreiber, the manager of that line, has placed at the service of the Committee a number of letters respecting the working of the new system, from which a few extracts may be submitted for the information of the Society. These extracts may be taken as samples of the opinions of intelligent practical railway-men who have had the best opportunities of judging:

Chief Train Despatcher G. M. Jarvis writes from Moncton, December 13th, 1887: "I consider it far in advance of the old system of time notation. For despatchers it is a great deal better and safer in every way. I have not heard a train-man speak but in the most favorable terms of it."

Station Master R. Macdonald writes from Halifax, December 12th:

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"The 24-hour system is a decided improvement, preventing confusion in reading time-tables and schedules of train records."

Conductor W. Kelly writes from St. John, December 10th: "I believe it is the best for time-tables and registering trains, as train men are not so liable to make mistakes as by the old system."

District Superintendent A. R. McDonald writes from Riviere du Loup, December 19th: "The simplification of the expression of time is a decided improvement, and not only in the time-table but in numberless minor affairs the new system has its advantages."

Chief Train Despatcher T. Crockett writes from Riviere du Loup: "In the despatching department this system is invaluable. For working and time orders the time cannot be misconstrued. Since its adoption on the Intercolonial I have not heard of a mistake being made with regard to time; the old excuse of 'I took it for morning instead of evening,' is entirely set aside."

Chief Superintendent D. Pottinger writes from Moncton, January 4th, 1888: I consider that the new system is a decided improvement on the old practice of dividing the day into A. M. and P. M. hours, as it is much simpler, and in the running of trains it removes a cause of danger that exists under the old system of ever mistaking an A. M. hour for a P. M. hour, either in the time-table or in train orders. In this way it is a benefit to the public, as it promotes their safety when traveling."

"I have made frequent inquiries when traveling over the line and find that the majority of employees on all parts of the road are pleased with it, and like it better than the old notation. The newspapers, when it was first introduced on the railway, in general spoke in favor of it, and I have seen no adverse comments on it since. The public, however, are slow in adopting it, but that is to be expected, as it is one of those changes which, while it commends itself to the reason, interferes with a long established custom."

These expressions of opinion are similar to those referred to by the Committee in the report submitted at the last Annual Meeting. They establish that wherever the new notation has been tried, it has proved to be equally advantageous to the railways and to the public. It is quite true that in sections of the country long settled and occupied by people with confirmed habits, the change is not so readily accepted by the public as in newer, more progressive and possibly more intelligent communities. But that the people in all localities will accept the change eventually, especially if the railroads take the initiative, there can be no doubt.

By the replies to Question No. 3, issued to members of the General Time Association, a majority of those heard from do not think it necessary, before adopting the new notation on the railways, to be assured that the people will accept it. They may be warranted in this opinion

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by the readiness with which the Standard Time system was accepted generally, when it was adopted by the railways four years ago. There are others who consider it advisable to take means gradually to prepare the public mind for the change.

With the latter object in view, the American Meteorological Society and the Canadian Institute (two societies which have for years ably co-operated with this Society in advancing the movement of Time reform) are about to appeal to the Chief Superintendents of Education in the United States and Canada, to bring the whole question of Time and its Notation before the public schools. By such means the youth of both sexes throughout the several States and Provinces between the Atlantic and Pacific will receive new and correct ideas on this subject, and it is believed that in a very few years the public mind will effectually be influenced to accept readily any desirable change which the general welfare may demand.

In referring to the progress in Time reform made during the past year, the Committee may mention the fact that on January 1st, 1888, the 24-hour notation was in use for railway purposes in the Provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Assiniboin, Atherton and British Columbia.

In other parts of the world the Time reform movement is making substantial progress. In Great Britain, in Sweden and throughout the Japanese Empire, the time in common use is in complete harmony with the Standard Time which we have throughout the United States and Canada. Hence it may be affirmed that the new system of time-reckoning is now introduced for public use in the three continents of America, Europe and Asia.

SANDFORD FLEMING,
Chairman of Special Committee.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BOLTON, CHANNING MOORE	Chief Engineer Richmond and Danville R.R.; President and Manager Richmond City (Va.) Ry. 1,300 Penn ave., Washington, D. C.	Jan. 4, 1888
D'INVILLIERS, CAMILE STANISLAUS	Philipsburg, Centre Co., Pa.,	Jan. 4, 1888
DUNLAP, DE CLERMONT	296 Warren ave., Chicago, Ill.	Jan. 4, 1888

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GLADDING, HENRY HOLBROOK	(Elected Junior, July 1, 1885). 30 Stanley st., New Haven, Conn	Jan. 4, 1888
HAVILAND, ARTHUR	(Elected Junior, Jan. 4, 1882) 591 East One Hundred and Thirty-fifth st., New York City	Jan. 4, 1888
LEDLIE, CHARLES HEES	417 Olive st., St. Louis, Mo	Jan. 4, 1888
NEWHAM, CHARLES EDWARD	(Care Special Water Commission). Albany, N. Y	Dec. 7, 1887
PATTEN, HENRY BENJAMIN	Division Engineer, Union Pacific Ry., Cheyenne, Wyo	Jan. 4, 1888
RICKON, FREDERIC JOHN HENRY	Engineer City Electric St. Ry., Little Rock, Ark	Jan. 4, 1888
STEWART, JOHN MUIRHEAD	(Elected Junior, March 2, 1887). P. O. Box 87, Dobb's Ferry, N. Y	Jan. 4, 1888
WRIGHT, GEORGE FRANCIS	City Surveyor, Santa Barbara, Cal	Jan. 4, 1888

JUNIORS.

ADAMS, JULIUS LE ROY	155 Congress st., Brooklyn, N. Y	Jan. 4, 1888
BAINBRIDGE, FRANCIS HENRY	Wilmington, Del	Jan. 4, 1888
CARROLL, EUGENE	(Care Trustees Covington Reservoir). Covington, Ky	Jan. 4, 1888
HILDRETH, RUSSELL WADSWORTH	Inspector for Messrs. Morison and Corthell, Athens, Pa	Jan. 4, 1888
KASTL, ALEXANDER EDWARD	Assistant to Division Engineer Chicago, Santa Fe and California Ry., Chillicothe, Ill	Jan. 4, 1888
LYDON, WILLIAM ANTHONY	Assistant Engineer Chicago Lake Tunnel, foot of Peck Court, Chicago, Ill	Jan. 4, 1888
POTTER, ALEXANDER	City Engineer's office, Kansas City, Mo	Jan. 4, 1888

DEATHS.

AINSLIE, GEORGE	Elected Fellow May 28th, 1872; died Sept. 7th, 1878.
FISHER, CHARLES H	Elected Member July 7th, 1869; died Jan. 18th, 1888.
MERCUR, FREDERICK	Elected Member July 20th, 1870; died Jan. 10th, 1888.
TRAFTON, GILMAN	Elected Member Jan. 4th, 1871; died May 25th, 1887.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—February, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

FEBRUARY 1ST, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates declared elected. As Members: Daniel Seymour Brinsmade, Birmingham, Conn.; Lorenzo Russell Clapp, Brooklyn, N. Y.; Frank Paul Davis, Washington, D. C.; Clarence Delafield, New York City; William Franklin Dennis, Washington, D. C.; Edward Flad (elected Junior, January 7th, 1885), St. Louis, Mo.; Emil Gerber, Sioux City, Iowa; George Blagden Hazlehurst, Baltimore, Md.; Allen Bogardus Hegeman, Ottumwa, Ia.; Alexander Joseph Swift, Albany, N. Y.; Elliott Hinckley Wilson, Butte City, Mont.; as Juniors: Kayajiro Kobayashi, Kansas City, Mo.; George E. Moulthrop, Butte City, Mont.; Robert Ridgway, Sing Sing, N. Y.

The death of Frank Beresford, Jun., Am. Soc. C. E., on December 12th, 1887; the death of Charles H. Fisher, M. Am. Soc. C. E., on January 18th, 1888; and also the death of Fred. Mercur, M. Am. Soc. C. E., on January 10th, 1888, were announced.

A paper on description of the work of constructing a dam across the Potomac River for increasing the water supply of Washington, D. C., by S. H. Chittenden, M. Am. Soc. C. E., was read by the author, and discussed by Messrs. Flagg, Fteley, Croes, R. L. Harris, Gen. G. S. Greene, Brush, Hutton, and the author.

FEBRUARY 15TH.—The Society met at 20 o'clock, Vice President J. James R. Croes in the chair; John Bogart, Secretary.

A paper on the classification of railroad accounts and the analysis of railroad rates, by Gratz Mordecai, Assoc. Am. Soc. C. E., was read.

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LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BRINSMADE, DANIEL SEYMOUR	Birmingham Water Power Co., Birmingham, Ala.	Feb. 1, 1888
CLAPP, LORENZO RUSSELL	Assistant Engineer Department City Works, Room 29, Brooklyn, N. Y.	Feb. 1, 1888
DAVIS, FRANK PAUL	48 I st., N. W. Washington, D. C.	Feb. 1, 1888
DELAFIELD, CLARENCE	11 Wall st., New York City.	Feb. 1, 1888
DENNIS, WILLIAM FRANKLIN	Assistant Engineer Panama R. R., Mills Building, New York City	Feb. 1, 1888
FLAD, EDWARD	(Elected Junior, Jan. 7, 1885). Mechanical Engineer Water Works Extension, St. Louis, Mo	Feb. 1, 1888
GERBER, EMIL	Resident Engineer Sioux City Bridge, Sioux City, Iowa.	Feb. 1, 1888
HAZLEHURST, GEORGE BLAGDEN	Engineer Bridges and Tests, Baltimore and Ohio R. R., Camden Station, Baltimore, Md	Feb. 1, 1888
HEGEMAN, ALLEN BOGARDUS	Resident Engineer Mexican Central Ry., Aguascalientes, Mexico	Feb. 1, 1888
SWIFT, ALEXANDER JOSEPH	Chief Engineer Northern R. R. Department, Delaware and Hudson Canal Co., Albany, N. Y.	Feb. 1, 1888
WILSON, ELLIOTT H.	(Care Wilson and Gillie), Butte, Mont.	Feb. 1, 1888

JUNIORS.

KOBAYASHI, KAYAJIRO	(Care Mr. Idrani), 7 Shimomakichio, Nipbonbashi, Tokio, Japan	Feb. 1, 1888
MOULTHROP, GEORGE E.	(Care Montana Central Ry.), Butte, Mont.	Feb. 1, 1888
RIDGWAY, ROBERT	Assistant Engineer Aqueduct Commission, Box 455, Sing Sing, N. Y.	Feb. 1, 1888

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—March, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MARCH 7TH, 1888.—The Society met at 20 o'clock, Mendes Cohen, Director Am. Soc. C. E., in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Fred. James Amweg, Philadelphia, Pa.; Oberlin Matthies Carter, Savannah, Ga.; Charles Sewall Gowen, Sing Sing, N. Y.; Charles Davis Jameson, New York City; Edward John Landor, Canton, O.; Hunter McDonald (elected Junior April 4th, 1883), New Market, Ala.; George Romaine Olney, Morris Dock, N. Y.; Francis Ensor Prendergast, Newton Highlands, Mass.; George Henry Robinson, Marysville, Mont.; Edward Wegmann, Jr., Englewood, N. J.; Arthur Owen Wilson, Birmingham, Ala.; John Young, Geneseo, N. Y. As Associate: John Haines Warder, Wilmington, Del. As Juniors: David Sylvanus Carll, Kansas City, Mo.; Charles Alfred Hasbrouck, Detroit, Mich.

The vote on the proposed amendments to the Constitution was canvassed. On the proposed amendments creating a Student grade, and raising the standard of qualification for the different grades, the vote was yeas, 137, nays, 142; these amendments, not having received two-thirds of all the votes cast, were declared not adopted. These proposed amendments are those marked **A**, and printed in Proceedings for January, 1888, pages 39 and 40.

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The proposed amendment to Article XVIII of the Constitution, by inserting after the word "acceptance" the following:

"Proposals for admission to the Society of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient, in their opinion, to show that the candidate is worthy of acceptance."

Received 251 affirmative and 32 negative votes. The amendment was declared adopted.

The proposed amendment to Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a re-consideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

Received 226 affirmative and 55 negative votes. This amendment was declared adopted.

The proposed amendment to Article XIX of the Constitution, by substituting for the whole Article the following:

Article XIX.

"Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes."

Received 69 affirmative and 212 negative votes. This amendment was declared not adopted.

The report of the Board of Censors to award the Norman Medal was read and adopted; it is as follows:

"The Board of Censors to award the Norman Medal for the year terminating August 1, 1887, report that, in their judgment, the award should be made to paper No. 340, 'Evaporation,' by Desmond FitzGerald, M. Am. Soc. C. E."

Respectfully submitted,

L. L. BUCK,
E. S. PHILBRICK,
T. J. WHITMAN,
Board of Censors.

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The report of the Committee to award the Rowland Prize was read and adopted; the report is as follows:

"The Committee appointed to award the Rowland Prize for the year terminating August 1st, 1887, reports that, in its judgment, the prize should be awarded to Paper No. 361, 'Steel; its Properties; its Use in Structures and in Heavy Guns,' by William Metcalf, M. Am. Soc. C. E."

Respectfully submitted,

E. SHERMAN GOULD,
G. LINDENTHAL,
JOHN BOGART,
Committee.

A paper on "Test of an Edison Incandescent Electric Lighting Plant," by John W. Hill, M. Am. Soc. C. E., was read and discussed by Messrs. J. W. Howell, Field, Flagg and R. L. Harris.

MARCH 21ST, 1888.—The Society met at 20 o'clock, Treasurer G. S. Greene, Jr., in the chair; John Bogart, Secretary.

The death, on March 15th, 1888, of Squire Whipple, Honorary Member of the Society, was announced.

A description of a 30-inch Wooden Conduit, designed and constructed for the Quincy, Ill., Water-works, by Edward Prince, M. Am. Soc. C. E., was read and discussed by Messrs. Greene, Brush and others.

The subject of the Durability of Timber was discussed by Messrs. Greene, H. W. Brinckerhoff, Flagg, Skinner, Buck, Whinnery and Brush.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
AMWEG, FREDERICK JAMES.....Civil Engineer and Architect, 834 North 40th st., Philadelphia, Pa.....	March 7, 1888
CARTER, OBERLIN MATTHIES....First Lieutenant, Corps of Engineers, U. S. A., P. O. Box 133, Savannah, Ga.....	March 7, 1888
GOWEN, CHARLES SEWALL.....Division Engineer, New Croton Aqueduct, Sing Sing, N. Y..	March 7, 1888
JAMESON, CHARLES DAVIS.....State University of Iowa, Iowa City, Iowa.....	March 7, 1888

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LANDOR, EDWARD JOHN	Vice-President and Engineer Wrought Iron Bridge Co., 127 N. Poplar st., Canton, Ohio	March 7, 1888
MCDONALD, HUNTER	(Elected Junior, April 4, 1883) Engineer-in-charge Nashville, Chattanooga and St. Louis Ry., Fayetteville, Tenn	March 7, 1888
OLNEY, GEORGE ROMAINE	32 West 31st st., New York City	March 7, 1888
PRENDERGAST, FRANCIS ENSOR	Sault Ste. Marie, Mich.	March 7, 1888
ROBINSON, GEORGE HENRY	Assistant General Manager and Engineer The Montana Co. (Ltd.), Marysville, Mont.	March 7, 1888
WEGMANN, EDWARD, JR.	Division Engineer New Croton Aqueduct, 324 St. Nicholas ave., New York City	March 7, 1888
WILSON, ARTHUR OWEN	Cor. 19th st. and Second ave., Birmingham, Ala.	March 7, 1888
YOUNG, JOHN	Geneseo, N. Y.	March 7, 1888

ASSOCIATE.

WARDER, JOHN HAINES	Wilmington, Del.	March 7, 1888

JUNIORS.

CARLL, DAVID SYLVANUS	1010 Grove st., Kansas City, Mo.	March 7, 1888
HASBROUCK, CHARLES ALFRED	Lincoln House, Cleveland, Ohio	March 7, 1888

DEATHS.

CASS, GEORGE W.	Elected Fellow, M c 30, 1871; died March 21, 1888.
LATIMER, CHARLES	Elected Member, April 5, 1876; died March 25, 1888.
WHIPPLE, SQUIRE	Elected Honorary Member, May 6, 1868; died March 13, 1888.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—April, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

APRIL 4TH, 1888.—The Society met at 20 o'clock, President Thomas C. Keefer in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates were declared elected. As Members: William Creelman Ambrose, Tulare, Cal.; Francis Webster Blackford, Jr., Butte, Mont.; Howard Breen, Pittsburgh, Pa.; Edward Carlos Carter, Chicago, Ill.; John Joseph Donovan (elected Junior April 7th, 1886), Helena, Mont.; Frank Louis Fuller (elected Junior April 4th, 1883), Boston, Mass.; Bruce F. House, Denver, Col.; James MacFarlane, Anaconda, Mont.; Charles Clemens Rose, Scranton, Pa.; Horace Edwards Stevens (elected Junior November 1st, 1876), St. Paul, Minn.; Charles Frederick Stowell, Albany, N. Y.; Arthur Newell Talbot, Champaign, Ill.; Charles Chancellor, Wentworth, Roanoke, Va. As Associate: George Henry Crafts, Atlanta, Ga. As Juniors: William George Clark, Toledo, O.; Arthur Leland Cornell, Tarrytown, N. Y.; Edward Burton Kent, Milwaukee, Wis.; William Willis Penney, St. Louis, Mo.; Louis Lincoln Tribus, New York City; Harry R. Wheeler, Sing Sing, N. Y.

The Secretary announced the deaths, on March 21st, 1888, of George W. Cass, Fellow of the Society, on November 5th, 1887; of W. A. G. Emonts, Jun., Am Soc. C. E., and of Charles Latimer, M. Am. Soc. C. E., on March 25th, 1888.

A paper on Sap in Trees in Winter, by J. Foster Flagg, M. Am. Soc. C. E., was read.

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Mr. R. K. Wright, formerly connected with the Engineer Corps of the Panama Canal, gave an informal statement of his observations upon the works in progress there, and the subject was discussed by Messrs. Flagg, F. M. Kelley, Nathan Appleton, Davis, Cooper, Colne and Wright.

APRIL 18TH, 1888.—The Society met at 20 o'clock, Vice President J. James R. Croes in the chair; John Bogart, Secretary.

The Secretary announced the death, on April 7th, 1888, of General Q. A. Gilmore, M. Am. Soc. C. E., and on September 7th, 1878, of George Ainslie, Fellow of the Society.

Papers on the Manufacture of Brick, near Chicago, by D. V. Purington, and on the Manufacture of Slate Brick, by José R. Villalon, were presented and discussed by Messrs. Tomkins, Emery, Bogart, Cartwright, Fteley, Flagg, R. L. Harris and Villalon.

A specimen of wood eaten by white ants, was exhibited by Mr. R. L. Harris.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AMBROSE, WILLIAM CREELMAN	Division Roadmaster Southern Pacific R. R., Tulare, Cal.	April 4, 1888
BLACKFORD, FRANCIS WEBSTER, Jr.	Resident Engineer Union Pacific R. R., Anaconda, Mont.	April 4, 1888
BREEN, HOWARD	Engineer Keystone Bridge Co., Pittsburgh, Pa.	April 4, 1888
CARTER, EDWARD CARLOS	Principal Assistant Engineer Chicago and Northwestern Ry., Chicago, Ill.	April 4, 1888
DONOVAN, JOHN JOSEPH	(Elected Junior April 7, 1886), Chief Engineer Skagit Coal and Transportation Co., 817 Eleventh st., Tacoma, Wash.	April 4, 1888
FULLER, FRANK LOUIS	(Elected Junior April 4, 1883), 12 Pearl st., Room 35, Boston, Mass.	April 4, 1888
HOUSE, BRUCE F	Collins, Huron Co., Ohio	April 4, 1888
MACFARLANE, JAMES	Anaconda, Mont.	April 4, 1888
ROSE, CHARLES CLEMONS	Division Engineer Delaware, Lackawanna and Western R. R., Scranton, Pa.	April 4, 1888

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STEVENS, HORACE EDWARD.....(Elected Junior November 1, 1876), P. O. Box 2,396, St. Paul, Minn..... April 4, 1888

STOWELL, CHARLES FREDERICK..Bridge Engineer New York State Board Railroad Commission, Albany, N. Y..... April 4, 1888

TALBOT, ARTHUR NEWELL.....Assistant Professor Engineering and Mathematics, University of Illinois, Champaign, Ill... April 4, 1888

WENTWORTH, CHARLES CHANCELLOR. Principal Assistant Engineer Construction Department, Norfolk and Western R. R., Roanoke, Va..... April 4, 1888

ASSOCIATE.

CRAFTS, GEORGE HENRY.....Civil Engineer and Contractor, Box 245, Atlanta, Ga..... April 4, 1888

JUNIORS.

CLARK, WILLIAM GEORGE.....City Engineer's Office, Toledo, Ohio..... April, 4, 1888

PENNEY, WILLIAM WILLIS.....Assistant Engineer Water Works, St. Louis, Mo..... April 4, 1888

TRIBUS, LOUIS LINCOLN.....84 Warren st., New York City.. April 4, 1888

WHEELER, HARRY R.....Box 327, Sing Sing, N. Y..... April 4, 1888

DEATHS.

GILMORE, QUINCY A.....Elected Member December 2d, 1868; died April 7th, 1888.

WALLING, HENRY F.....Elected Member May 6th, 1868; died April 8th, 1888.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—May, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MAY 2D, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

Ballots for membership were canvassed and the following candidates declared elected: Kenneth Allen, Kansas City, Mo.; Latham Anderson, Cincinnati, O.; Thomas Aspinwall, Boston, Mass.; Robert Bassel, Washington, D. C.; Harry Dean Bush, Montreal, Canada; Clarence Allen Carpenter, Chillicothe, Mo.; George Edwin Evans, Lowell, Mass.; Francis Davis Fisher, New York City; Arthur Hodges, Johnstown, Pa.; George Washington Howell, Morristown, N. J.; Everett Wilson Lewis, Belmont, Wash.; Emile Low, Cedar Bluffs, Va.; Harry Irving Miller, Richmond, Ind.; Arthur Lorenzo Mills, Toledo, O.; Edmund Trowbridge Dana Myers, Richmond, Va.; Philip M. Price, West Point, N.Y.; Beverly Strother Randolph, Frostburg, Md.; Thomas Pearman Shanks, Louisville, Ky.; George Morris Thompson, Boston, Mass.; Thomas Delano Whistler (elected Junior March 5th, 1881), New York City. As Associate: James Breckinridge Speed, Louisville, Ky. As Juniors: James Hillhouse Fuertes, Wichita, Kans.; William Gray, Tarrytown, N. Y.; Horace Joseph Howe, Elmira, N. Y.; Edmund Trobridge Dana Myers, Jr., Richmond, Va.; John Edwin Ostrander, Macedon, N. Y.; Charles Bradley Rowland, Greenpoint, N. Y.; Eugene Raymond Smith,

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Islip, N. Y.; William Holland Stair, Fort Riley, Kan.; George Atwater Tibbals, Brooklyn, N. Y.; Samuel Gaylord Tibbals, Brooklyn, N. Y.; Hubert Waldo York, New York City.

The Secretary announced that, under the will of the late Sullivan Haslett, M. Am. Soc. C. E., his professional books relating to the subject of Civil Engineering, were bequeathed to the Society.

A discussion on the paper previously read, upon the Test of an Edison Incandescent Electric Lighting Plant, by John W. Hill, M. Am. Soc. C. E., was presented.

Some data as to Sewage Disposal, prepared by Mr. Joseph Nimo, Jr., were read.

MAY 16TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair; John Bogart, Secretary.

The death, on April 8th, 1888, of Henry F. Walling, M. Am. Soc. C. E., was announced.

A paper on High Walls or Dams, to Resist the Pressure of Water, by James B. Francis, Past President Am. Soc. C. E., was presented and discussed by Messrs. Maclay, Frizell, Collingwood, E. Wegman, Jr., H. W. Brinckerhoff, G. S. Greene, Fteley, Bogart, Cooper, North, Emery, Whistler and the author.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.	Date of Election.
ALLEN, KENNETH.,.....310 Baird Building, Kansas City, Mo.....	May 2, 1888
ANDERSON, LATHAM.....Johnston Building, Room 49, Cincinnati, Ohio.....	May 2, 1888
ASPINWALL, THOMAS.....12 Pearl st., Boston, Mass.....	May 2, 1888
BASSELL, ROBERT.....Technical Attache Imperial German Legation, Washington, D. C.....	May 2, 1888
BUSH, HARRY DEAN.....Superintendent Lachine Works, Dominion Bridge Co., Montreal, Canada.....	May 2, 1888
CARPENTER, CLARENCE ALLEN....Principal Assistant Engineer Bridges and Buildings, Chicago, Milwaukee and St. Paul Ry., Milwaukee, Wis...	May 2, 1888
EVANS, GEORGE EDWIN.....Lowell, Mass.....	May 2, 1888

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FISHER, FRANCIS DAVIS	Resident Engineer Suburban Rapid Transit Co., 19 West 125th St., New York City	May 2, 1888
HODGES, ARTHUR	Chief Engineer Johnson Steel Street Rail Co., Johnstown, Pa.	May 2, 1888
HOWELL, GEORGE WASHINGTON	Lock Box 58, Morristown, N. J.	May 2, 1888
LEWIS, EVERETT WILSON	Opera House, Room 7, Duluth, Minn.	May 2, 1888
LOW, EMILE	Division Engineer Clinch Valley Division Norfolk and Western R.R., Tazewell C. H., Va.	May 2, 1888
MILLER, HARRY IRVING	Richmond, Ind.	May 2, 1888
MILLS, ARTHUR LORENZO	Chief Engineer Toledo, St. Louis and Kansas City Ry., Toledo, Ohio	May 2, 1888
MYERS, EDMUND TROWBRIDGE DANA	General Superintendent Richmond, Fredericksburg and Potomac R. R., Richmond, Va.	May 2, 1888
PRICE, PHILIP M.	Capt. Corps of Engineers, U. S. A., West Point, N. Y.	May 2, 1888
RANDOLPH, BEVERLY STROTHER	Mining Superintendent Consolidation Coal Co., Frostburg, Md.	May 2, 1888
SHANKS, THOMAS PEARMAN	237 Jacob st., Louisville, Ky.	May 2, 1888
THOMPSON, GEORGE MORRIS	Lock Box 1,455, Woburn, Mass.	May 2, 1888
WHISTLER, THOMAS DELANO	(Elected Junior March 5, 1881), 640 Madison avenue, New York City	May 2, 1888

ASSOCIATE.

SPEED, JAMES BRECKINRIDGE	General Manager Louisville Cement Co., 331 West Main st., Louisville, Ky.	May 2, 1888

JUNIORS.

GRAY, WILLIAM	Tarrytown, N. Y.	May 2, 1888
HOWE, HORACE JOSEPH	Assistant to Roadmaster Susquehanna Division New York, Lake Erie and Western R.R., Elmira, N. Y.	May 2, 1888
MYERS, EDMUND TROWBRIDGE DANA, JR.	Assistant City Engineer, Richmond, Va.	May 2, 1888

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OSTRANDER, JOHN EDWARD...	..Care Division Engineer New York State Canals, Albany, N. Y.....	May 2, 1888
ROWLAND, CHARLES BRADLEY....	Continental Iron Works, Greenpoint, N. Y.....	May 2, 1888
SMITH, EUGENE RAYMOND.....	Islip, Suffolk Co., N. Y.....	May 2, 1888
STAIR, WILLIAM HOLLAND.....	Fort Riley, Kans.....	May 2, 1888
TIBBALS, GEORGE ATWATER	148 Milton st., Brooklyn, N. Y.	May 2, 1888
TIBBALS, SAMUEL GAYLORD.....	148 Milton st., Brooklyn, N. Y.	May 2, 1888
YORK, HERBERT WALDO.....	22 Cortland st., New York City.	May 2, 1888

DEATH.

BAKER, WILLIAM L.....Elected Junior Jan. 6th, 1875; Elected Member Nov. 6th, 1878; died May 28th, 1888.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV, June, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JUNE 6TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

Ballots for membership were canvassed, and the following candidates declared elected. As Members: William Henry Baldwin, Yonkers, N. Y.; William Murray Black, St. Augustine, Fla.; Dexter Brackett, Boston, Mass.; Francis Smith Burrowes, Lancaster, Pa.; Willis Chipman, Brockville, Canada; Solomon Lefevre Deyo, Harrison, N. Y.; Henry Goldmark (elected Junior May 7th, 1884), Kansas City, Mo.; Lewis Muhlenberg Haupt, Philadelphia, Pa.; Joseph Warren Hoover, Kansas City, Mo.; Lewis Blake Jackson, Chicago, Ill.; Cassius William Kelley (elected Junior March 1st, 1882), New Haven, Conn.; Alexander Macomb Miller, St. Louis, Mo.; Richard Montfort, Louisville, Ky.; John Frank Stevens, Marquette, Mich. As Associate: Louis De Coppet Berg, New York City. As Juniors: Andre Pierre Tachard, New York City; Job Tuthill, Ionia, Mich.

The death, on May 28th, 1888, of William L. Baker, M. Am. Soc. C. E., was announced.

Details as to Convention arrangements were announced.

An account of the First Locomotive on the Philadelphia, Germantown and Norristown Railroad was read.

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JUNE 20TH, 1888.—The Society met at 20 o'clock, Director A. Fteley in the chair; John Bogart, Secretary.

Further details as to the approaching Convention were announced.

A paper on an Automatic Waste Weir, by A. D. Foote, M. Am. Soc. C. E., was read, and discussed by Messrs. Fteley, Croes, Davis, Bogart and Ackenheil.

OF THE BOARD OF DIRECTION.

FEBRUARY 1ST, 1888.—Applications were considered. Financial business was transacted.

MARCH 8TH, 1888.—Applications were considered. Financial business transacted.

APRIL 15TH, 1888.—Applications were considered. A committee to determine details as to the Convention was appointed.

MAY 3D, 1888.—Applications were considered. Time for holding the Convention discussed.

MAY 15TH, 1888.—Proposition for sale of the Transactions to local societies and to individuals considered. Regular business transacted.

JUNE 7TH, 1888.—Applications were considered. Arrangements for Convention discussed. A form of circular in reference to publications was prepared.

JUNE 27TH, 1888.—Details as to Convention perfected.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BALDWIN, WILLIAM HENRY	Engineer Board Water Commissioners and City Surveyor, Manor Hall, Yonkers, N. Y.	June 6, 1888
BLACK, WILLIAM MURRAY	Captain Corps of Engineers, U. S. A., P. O. Box 541, Asheville, N. C.	June 6, 1888
BRACKETT, DEXTER	Superintendent Eastern and Mystic Divisions Boston Water Works, 221 Federal st., Boston, Mass.	June 6, 1888
BURROWES, FRANCIS SMITH	U. S. Engineers' Office, Portland, Maine	June 6, 1888
CHIPMAN, WILLIS	City Engineer, Brockville, Ontario, Canada	June 6, 1888

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DEYO, SOLOMON LEFEVRE.....Assistant Engineer New York, New Haven and Hartford R. R., Harrison, N. Y..... June 6, 1888

GOLDMARK, HENRY.....(Elected Junior May 7, 1881) office General Manager Kansas City, Fort Scott and Gulf R. R., Kansas City, Mo..... June 6, 1888

HAUPT, LEWIS MUHLENBERG....Consulting Engineer, University of Pennsylvania, Philadelphia, Pa..... June 6, 1888

HOOVER, JOSEPH WARREN .....Engineer and Manager Western office Wrought Iron Bridge Co., Kansas City, Mo..... June 6, 1888

JACKSON, LEWIS BLAKE.....Chief Engineer Elgin, Joliet and Eastern Ry., Chicago, Ill. June 6, 1888

KELLY, CASSIUS WILLIAM.....(Elected Junior March 1, 1882) 18 City Hall, New Haven, Conn..... June 6, 1888

MILLER, ALEXANDER MACOMB...Major Corps of Engineers, U. S. A., St. Louis, Mo..... June 6, 1888

MONTFORT, RICHARD.....Chief Engineer Louisville and Nashville R. R., Louisville, Ky..... June 6, 1888

STEVENS, JOHN FRANK .....Principal Assistant Engineer Duluth, South Shore and Atlantic Ry., Marquette, Mich. June 6, 1888

ASSOCIATE.

BERG, LOUIS DE COPPET.....111 Broadway, New York City. June 6, 1888

JUNIORS.

TACHARD, ANDRE PIERRE.....15 rue Louis le Grand, Paris, France..... June 6, 1888

TUTHILL, JOB .....Assistant Engineer Detroit, Lansing and Northern R. R. Ionia, Mich..... June 6, 1888

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—July, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

Annual Convention of the Society.

Held at Milwaukee, Wis., June 28th–July 4th, 1888.

First Session, June 28th, Morning.—The Convention was called to order at 10.30 in the Hall of the Athenæum Building, by Vice-President J. James R. Croes, who read the provisions of the Society law relating to Conventions.

On nomination of Past President D. J. Whittemore, George H. Benzenberg, M. Am. Soc. C. E., of Milwaukee, was elected permanent Chairman of the Convention. Mr. John Bogart, Secretary of the Society, was elected Secretary of the Convention.

On taking the chair, Mr. Benzenberg addressed the Convention and, in concluding, announced the arrangements made by the local committee.

A paper by Charles B. Brush, Director Am. Soc. C. E., on "Some Facts in Relation to Friction, Waste and Loss of Water in Mains," was read by the author and discussed by Messrs. Benzenberg, Francis, Weston, Whitman, Crowell, Loweth, Goad and the author.

Second Session, June 28th, Afternoon.—Mr. G. H. Benzenberg in the chair. The discussion on the paper, "Some Facts in Relation to Friction, Waste and Loss of Water in Mains," was continued by Messrs. Fanning, Fteley, Merriman, Croes, Oberlin Smith, G. W. Pearsons, Benzenberg and the author.

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A paper by E. E. Russell Tratman, Jun. Am. Soc. C. E., on "English Railroad Track," was read by the author.

During the afternoon of June 28th a reception was given at the Athenæum to the wives, daughters and lady guests of the Members, by the Woman's Club of Wisconsin.

THIRD SESSION, June 28th, Evening.—Mr. G. H. Benzenberg in the chair. Public Meeting. An address was made by E. S. Elliott, Esq., City Attorney, in behalf of the citizens of Milwaukee. A response to this address was made by J. J. R. Croes, Vice-President of the Society.

An address was made by Mr. Charles L. Colby, F. Am. Soc. C. E., on behalf of the local membership of Milwaukee. A response to this address was made by Joseph M. Wilson, Director of the Society.

The Annual Address of the President of the Society, Mr. Thomas C. Keefer, was, in the absence of the President, read by the Secretary.

After the conclusion of the President's Address, the following resolution was unanimously adopted by a rising vote:

Resolved, That, in view of the sad affliction that has prevented the attendance of our much respected President at this Convention, we tender him our most sincere sympathy and condolence in his time of bereavement.

FOURTH SESSION, Friday, June 29th, Morning.—Mr. G. H. Benzenberg in the chair. A paper by Joseph T. Dodge, M. Am. Soc. C. E., on "Destruction of Rails by Excessive Weights," was read by the author, and that paper and the paper on "English Railroad Track," by E. E. R. Tratman, were discussed by Messrs. W. W. Rich, Thomas Rodd, P. Roberts, Jr., F. W. Skinner, Gottlieb, Loree, W. H. Jennings, H. Goldmark, and C. F. Loweth.

On the suggestion of Mrs. James B. Francis, a vote of thanks, in behalf of the ladies of the Society, was tendered to the ladies of Milwaukee for their many courtesies and very kind attentions to the ladies in attendance at the Convention.

FIFTH SESSION, June 29th, Afternoon.—Mr. H. G. Benzenberg in the chair. A paper by G. W. Pearsons, M. Am. Soc. C. E., on "Siphons for the Water Works of Kansas City," was read by the author, and discussed by Messrs. S. B. Downes, C. B. Brush and the author.

A paper by Colonel William P. Craighill, M. Am. Soc. C. E., on "Some Observations on the Subject of the Improvement of Several of the Rivers of the Atlantic Coast," was read, in the absence of the author, by Mr. C. P. E. Burgwyn, M. Am. Soc. C. E.

The business meeting of the Convention was held during this afternoon; the minutes will be found on a following page.

On the evening of June 29th a reception was given at the Athenæum

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to the visiting members and guests of the Society, by the local members at Milwaukee.

SIXTH SESSION, Saturday, June 30th, Morning.—Mr. G. H. Benzenberg in the Chair. The President of the Association for the Improvement of Milwaukee, Mr. Goodrich, presented, with some remarks, a souvenir book to the members present. A response was made by Mr. C. B. Brush, Director.

A paper, previously published in the Transactions, on "The Venturi Water Meter," by Clemens Herschel, M. Am. Soc. C. E., was discussed by Messrs. Merriman, J. B. Francis, J. B. Johnson, O. H. Landreth and the author.

A paper by James B. Francis, Past President Am. Soc. C. E., on "High Walls or Dams to Resist the Pressure of Water," was read by the author, and discussed by Messrs. F. Collingwood, J. B. Johnson, N. M. Edwards, A. Fteley and the author.

The papers on "The Brick Industry About New York City," by Calvin Tomkins, Assoc. Am. Soc. C. E.; "A Note on Brick Making in Sinaloa, Mexico," by Don F. Sosa y Avela; "Slate Bricks," by José R. Villalon; "The Manufacture of Brick near Chicago," by D. V. Purington, were presented, and the subject of brick manufacture was discussed by Messrs. D. V. Purington, J. T. Dodge, Benzenberg, Edwards, J. B. Francis, Dempster, Bogart, J. B. Johnson, Robert Moore, Seaman, C. L. Gates, I. O. Baker and A. D. Conover.

At the request of the local committee, Prof. Linderfelt made a short address on the subject of "Volapuk; the Importance of an International Language for Scientific Purposes."

On the afternoon of Saturday, June 30th, visits were made, by special train, to the works of E. P. Allis, the shops of the Chicago, Milwaukee and St. Paul Railway, and the works of the Milwaukee Cement Company.

In the evening an opera at Schlitz's Park was given, complimentary to the Society, at the request of the local members.

SEVENTH SESSION, Monday July 2d, Morning.—Mr. G. H. Benzenberg in the chair. A paper by A. J. DuBois, Jun. Am. Soc. C. E., on "The Weights of Bridge Trusses," was read.

A paper by G. Leverich, M. Am. Soc. C. E., on "An Investigation to Determine the Strains in a Hollow Cast Iron Disk, Cooled from the Interior," was, in the absence of the author, read by the Secretary.

A paper by William P. Williams, C. E., on "The Panama Canal," was, in the absence of the author, read by the Secretary.

A paper by J. R. Wardlaw, M. Am. Soc. C. E., on "The Method Used for Moving the Brighton Beach Hotel," was read by the author.

The papers already published on the Inspection and Maintenance of Railway Structures and on Inspectors and Bridge Work, were discussed by H. B. Seaman, M. Am. Soc. C. E.

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A paper by C. L. Strobel, M. Am. Soc. C. E., on "Z-Iron Columns," was presented and discussed by D. J. Whittemore, Past President Am. Soc. C. E.

A paper by J. W. Post, C. E., on "Maintenance-Expenses of Wood and Metal Railroad Ties," with discussion, by E. E. Russell Tratman, was read.

On motion of Mr. J. J. R. Croes, the thanks of the American Society of Civil Engineers were tendered to the Woman's Club of Wisconsin for the courtesies extended to the Society during the Annual Convention.

On motion of Mr. A. Fteley, a resolution was adopted, tendering the thanks of the Society for the cordial welcome extended by Milwaukee, and for the uniform courtesies experienced from the citizens of that place.

On motion of Mr. Mendes Cohen, a vote of special thanks was tendered to the members of the Local Committee.

On motion of Mr. Percival Roberts, Jr., the thanks of the Society were tendered to Mr. G. H. Benzenberg, Chairman of the Local Committee and presiding officer of the Convention.

On motion of Mr. G. H. Benzenberg, the thanks of the Society were tendered, by a rising vote and cheers, to Mr. D. J. Whittemore, to which Mr. Whittemore responded with a few remarks.

On motion of Mr. C. B. Brush, the thanks of the Society were tendered to Messrs. E. P. Allis & Co., the Chicago, Milwaukee and St. Paul Railway and the Milwaukee Cement Company for courtesies during the Society Excursion.

The Convention then adjourned.

On the afternoon of July 2d, the members and guests were taken by carriage to points of interest about the city and to the National Soldiers' Home.

On the evening of July 2d, a banquet at the Plankinton Hotel was tendered to the members and guests by the Local Committee. There were present about two hundred persons, including a large number of ladies. The toasts and speakers in response were as follows: The President, J. J. R. Croes; "Milwaukee," G. Hazleton; "Wisconsin," Horace Rublee; "Unknown," Charles L. Colby; "Woman," Percival Roberts, Jr.; "Man," Miss Bessie Hearding; song, "A man's a man for a' that;" "The Secretary," John Bogart; "Past," D. J. Whittemore; "Railway Development," Mendes Cohen; "Wind," George W. Peck; "German Engineering," Robert Bassel; "Engineering Education," Charles B. Brush; "Hydraulics," Alphonse Fteley.

On Tuesday, July 3d, an excursion by special train was made to Appleton and Kaukauna, *via* the Milwaukee and Northern Railroad, where the water power, the pulp and paper mills and the electric street

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railway were inspected. The party returned to Milwaukee *via* the Milwaukee, Lake Shore and Western Railroad.

On Wednesday, July 4th, a visit was made to Oconomowac, *via* the Chicago, Milwaukee and St. Paul Railway. The guests were driven about Lac La Belle and had a steamboat ride upon the lake. After dinner, at Oconomowoc, the party proceeded to Waukesha for supper, and thence returned to Milwaukee by the same train.

A number of members took an excursion, after the close of the Convention, to the mineral regions of Wisconsin and Michigan, and to the Sault Ste. Marie.

The following 133 members were in attendance at the Convention:

Almon B. Atwater, Detroit, Mich.; Samuel G. Artingstall, Chicago, Ill.; Edward P. Allis, Thomas Appleton, Milwaukee, Wis.; Thomas W. Baldwin, Bangor, Me.; Frederick Brooks, Boston, Mass.; John W. Bacon, Danbury, Conn.; John Bogart, Charles B. Brush, New York City; William F. Booth, Poughkeepsie, N. Y.; Robert Bassel, Washington, D. C.; C. P. E. Burgwyn, Richmond, Va.; M. J. Becker, A. F. Brown, Pittsburgh, Pa.; C. Newton Brown, Columbus, O.; Cabell Breckinridge, Covington, Ky.; Onward Bates, George H. Benzenberg, Milwaukee, Wis.; Daniel Bontecou, Kansas City, Mo.; Moses Burpee, Woodstock, N. B., Canada; J. James R. Croes, New York City; William B. Cogswell, Syracuse; Charles L. Crandall, Ithaca, N. Y.; Mendez Cohen, Baltimore, Md.; J. Foster Crowell, Cincinnati, O.; Joseph P. Card, Edward C. Carter, Chicago, Ill.; C. A. Carpenter, Charles L. Colby, Albert Conro, Milwaukee; Allan D. Conover, Madison, Wis.; Joseph P. Davis, Stancliff B. Downes, New York City; Charles Davis, Alexander Dempster, Pittsburgh, Pa.; D. C. Dunlap, Chicago, Ill.; Charles E. L. B. Davis, Milwaukee, Wis.; Joseph T. Dodge, Duluth, Minn.; Robert L. Engle, La Salle, Ill.; N. M. Edwards, Appleton, Wis.; Howard N. Elmer, St. Paul, Minn.; James B. Francis, Lowell, Mass.; Alphonse Fteley, New York City; Edward Flad, Henry Flad, St. Louis, Mo.; John A. Fulton, Wellington, Kans.; John T. Fanning, Minneapolis, Minn.; Edward B. Guthrie, Buffalo, N. Y.; Charles E. Goad, Montreal, Canada; C. L. Gates, Toledo, O.; Philip Golay, Vevay, Ind.; A. Gottlieb, Chicago, Ill.; Henry Goldmark, Kansas City, Mo.; Gideon F. Haynes, Boston, Mass.; James D. Hawks, Detroit, Mich.; William M. Hughes, Cleveland, O.; E. A. Hermann, Indianapolis, Ind.; John W. Hill, Cincinnati, O.; Charles Hermany, Louisville, Ky.; M. L. Holman, St. Louis, Mo.; S. A. Harrison, H. J. Hilbert, Milwaukee, Wis.; Frank W. Handy, Olaf Hoff, Minneapolis; Horace E. Horton, Rochester, Minn.; William H. Jennings, Columbus, O.; J. B. Johnson, St. Louis; Mo.; K. Kobayashi, Chicago, Ill.; F. W. Kimball, Milwaukee, Wis.; Olin H. Landreth, Nashville, Tenn.; Thomas D. Lovett, Cincinnati, O.; L. F. Loree, Wellsville, O.; Moritz Lassig, Harry H. Latham, William

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H. Lotz, Chicago, Ill.; Frank Lawler, Burlington, Ia.; Charles F. Loweth, St. Paul, Minn.; George E. Mann, Buffalo, N. Y.; Mansfield Merriman, Bethlehem, Pa.; John McLeod, Louisville, Ky.; Robert E. McMath, Robert Moore, St. Louis, Mo.; R. R. Minturn, Milwaukee, Wis.; George A. Marr, S. D. Mason, St. Paul, Minn.; George B. Nicholson, Covington, Ky.; Edwin G. Nourse, Chicago, Ill.; Joseph O. Osgood, Cleveland, O.; Thomas W. Orbison, Appleton, Wis.; William H. Paine, George H. Pegram, Henry G. Prout, New York City; H. W. Parkhurst, Chicago, Ill.; Charles J. Poetsch, Milwaukee, Wis.; Galen W. Pearsons, Alexander Potter, Kansas City, Mo.; Percival Roberts, Jr., Philadelphia; Thomas Rodd, Pittsburgh, Pa.; Robert L. Read, Cincinnati, O.; Albert F. Robinson, L. W. Rundlett, St. Paul; W. W. Rich, Minneapolis, Minn.; Albert B. Rogers, Waterville, Wash.; C. C. Schneider, Frank W. Skinner, New York City; John S. Schaeffer, Newark; Oberlin Smith, Bridgton, N. J.; Henry B. Seaman, Philadelphia; Felician Slataper, Pittsburgh, Pa.; J. W. Schaub, Detroit, Mich.; George H. Simpson, Terre Haute, Ind.; Robert A. Shailer, C. L. Strobel, Chicago. Ill.; Horace E. Stevens, St. Paul, Minn.; C. H. Sawyer, Scottsville, Kans.; E. E. Russell Tratman, Alfred W. Trotter, New York City; Edward B. Taylor, Pittsburgh, Pa.; Job Tuthill, Ionia, Mich.; Arthur N. Talbot, Champaign, Ill.; George W. Vaughan, Cleveland, O.; James R. Wardlaw, New York City; O. B. Wheeler, Joseph M. Wilson, Philadelphia; Jesse W. Walker, Pittsburgh, Pa.; L. L. Wheeler, George Y. Wisner, Detroit, Mich.; Frederick C. Weir, Samuel Whinery, Cincinnati, O.; Thomas J. Whitman, St. Louis; J. A. L. Waddell, Kansas City, Mo.; John F. Wallace, Fort Madison, Ia.; Don J. Whittemore, Milwaukee, Wis.

Fifty-nine ladies of the families of members accompanied them on the occasion of this Convention.

MEETINGS OF THE SOCIETY.

JUNE 29TH, 1888 (business meeting during the Annual Convention at Milwaukee, Wis.).—J. J. R. Croes, Vice-President Am. Soc. C. E., in the chair; John Bogart, Secretary.

The report of the Committee on Uniform Standard Time (printed hereafter) was presented, and read by the Secretary. On motion, the report of the Committee was accepted, and the Committee continued.

The following resolution, offered by the Chairman of this Committee, was presented and discussed, and, on motion, this resolution, and the treatise to which it refers, was referred to a Special Committee, to consist of Messrs. Frederick Brooks and Percival Roberts, Jr.; this Committee to report at a future meeting of the Society. The resolution is as follows:

"*Resolved*, That, in accordance with the recommendations contained in the report of the Committee on Standard Time, the treatise on Time

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and its Notation, be brought to the notice of the Bureau of Education, with the request that it be widely disseminated for the use of the schools of the United States, and that the Superintendents of Education be invited to enjoin teachers to give special lectures and lessons on the subject to the pupils attending the schools, and that such other means be taken as may be deemed best to attain the object aimed at by the report of the Committee."

The report of the Committee on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry was presented by the Secretary. On motion, the report was accepted and ordered printed, and the Committee was continued.

On behalf of the Committee to consider the Proper Relation to each other of the Sections of Railway Wheels and Rails, Mr. Thomas Rodd announced that a large amount of information had been gathered by that Committee, and presented its report of progress. On motion, this Committee was continued, and the report of progress accepted and ordered printed.

The Committee appointed at the last annual meeting to formulate recommendations with reference to the Grades and Titles of Engineers, through their chairman, Mr. D. J. Whittemore, presented a partial report, which was, at Mr. Whittemore's request, on motion, referred back to the Committee to perfect.

A statement as to the progress made by the Committee on Subscriptions to the Building Fund of the Society was presented, and the Committee continued.

The next business in order being the appointment of a Committee to nominate officers for the ensuing year, the Secretary, by request, read the method adopted at the previous Convention, with the geographical distribution as follows :

No. 1. Resident Members, New York City and 50 miles around it.
No. 2. Rest of New York State, New England and Canada.
No. 3. New Jersey, Pennsylvania, Delaware, Ohio, Indiana, Michigan.
No. 4. Illinois, Missouri, Wisconsin, Minnesota, Dakota, Nebraska, Washington Territory, Oregon.
No. 5. All the rest of the States and Mexico.

On motion of Mr. R. E. McMath, the following geographical distribution was substituted :

No. 1. Resident Members, New York City and 50 miles around.
No. 2. The rest of New York, New England and Canada.
No. 3. Pennsylvania and the South Atlantic States.
No. 4. The southern States, with Missouri, Kansas and Colorado, and the Pacific Slope.
No. 5. The Ohio River States and the Northwest.

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A recess of five minutes was then taken, in order that those present from each of the several districts might select names to put in nomination. The session was then resumed, and on nomination of the members from each of these districts, the following Committee was appointed: District No. 1, William G. Hamilton; No. 2, Frederic P. Stearns; No. 3, Alexander Dempster; No. 4, William B. Knight; No. 5, A. B. Rogers.

On motion, it was resolved that all reports of special and standing committees should be transmitted to the Secretary at least sixty days before the Annual Convention, the Secretary to have the same printed and distributed to the members at least twenty days before the Convention.

On motion, it was ordered that the current ballot for membership be canvassed at an adjourned meeting, to be held at New York on July 14th.

The meeting then adjourned to that date.

JULY 14TH, 1888.—At an adjourned session of the meeting of July 4th, held at New York, July 14th, 1888, ballots were canvassed, and the following candidates were declared elected: Charles Leroy Annan, St. Paul, Minn.; John Quincy Barlow (elected Junior April 7th, 1886), Omaha, Neb.; William Henry Booth, New York City; George Barker Burbank, Brewster, N. Y.; William Dexter Bullock (elected Junior September 5th, 1877), Providence, R. I.; Otto Carl Edward Budde, Essen, Germany; Oswald Herbert Ernst, Galveston, Tex.; Edwin Augustus Fisher, Rochester, N. Y.; Edward Appleton Greene, Zanesville, O.; Daniel Jones Lucas (elected Junior September 6th, 1876), New York City; John Lundie, Chicago, Ill.; Frederick Weinhagen, Milwaukee, Wis. As Juniors: Walter McCulloh, Brewster, N. Y.; Albert Howell Porter, Brewster, N. Y.; Ira Alexander Shaler, New York City; Jose Ramon Villalon y Sanchez, Bethlehem, Pa.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Election.
ANNAN, CHARLES LE ROY	Engineer's office Union Pacific Ry., Omaha, Neb	July 4, 1888
BARLOW, JOHN QUINCY	(Elected Junior April 7, 1886), Division Engineer Union Pacific Ry., Leadville, Colo.	July 4, 1888
BOOTH, WILLIAM HENRY	Lonsdale, Flixton, Manchester, England	July 4, 1888
BUDDE, OTTO CARL EDWARD	Essen, Prussia	July 4, 1888
BULLOCK, WILLIAM DEXTER	(Elected Junior September 5, 1877), Assistant Engineer in charge Bridges, City Engineer's office, Providence, R. I.	July 4, 1888

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BURBANK, GEORGE BARKER	Division Engineer New Croton Aqueduct, Brewster, N. Y.	July 4, 1888
ERNST, OSWALD HERBERT	Major Corps of Engineers, U. S. A., Galveston, Texas	July 4, 1888
GREENE, EDWARD APPLETON	Chief Engineer Zanesville and Ohio River Ry., Zanesville, Ohio	July 4, 1888
LUCAS, DANIEL JONES	(Elected Junior September 6, 1876), Engineer in charge of Main's Standard Gas Light Co., 515 East 115th st., New York City	July 4, 1888
WEINHAGEN, FREDERICK	Milwaukee, Wis	July 4, 1888

JUNIORS.

MCCULLOH, WALTER	Assistant Engineer Sodom Dam, Brewster, N. Y.	July 4, 1888
PORTER, ALBERT HOWELL	New Croton Aqueduct, Brewster, N. Y.	July 4, 1888
SHALER, IRA ALEXANDER	Assistant Engineer New Aqueduct Commission, 103 St. Nicholas ave., New York City	July 4, 1888
VILLALON Y SANCHEZ, J. RAMON.	South Bethlehem, Pa.	July 4, 1888

REPORT OF THE SPECIAL COMMITTEE ON STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL CONVENTION, JUNE 29TH, 1888.

The Committee beg leave to refer to the report submitted at the Annual Meeting of the Society in January last. The progress of the time reform movement throughout the world was therein set forth at some length. Since that date the movement has made steady, although not rapid, progress wherever the twenty-four hour notation has been adopted in the operating of railways. It continues to command the good opinion of the large majority of railway men. Indeed it may be said to obtain the favor of all who have had opportunities of experiencing its advantages.

In the last report it was stated that the twenty-four hour notation was in use for railway purposes in every province of Canada, from Nova Scotia to British Columbia. It has not yet been adopted on all the railways of the Dominion, but as stated, it is in use in each of the eight provinces, and there is an intention to extend its use. In Manitoba it has been introduced now for about two years, and one letter may be quoted to show to what extent it is accepted by the general public. The Chief Superintendent of Education wrote on the 4th of the present month that the new time notation is gradually being brought into common use. "It cannot be expected (he adds) that references to time under the old

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notation will cease at once, but there is every indication, here at least, that it will not be long before the new system will become universal."

This one fact shows very clearly that however strong the influence of long established usage and old customs may be, a reform such as this, which appeals direct to the reason and common sense of the community, must sooner or later be crowned with complete success.

Suggestions have come from several quarters as to the adoption of means more speedily to destroy the adhesion of the great mass of people to the old usages. There can not be a doubt that so soon as the railway companies see their way to make the change the public will accept it, and in course of a few years the old notations will be a thing of the past in America. In the meanwhile it has been suggested that the subject of time and its proper notations should be brought in its educational aspect before the youth of the country; that, in fact, means should be taken to familiarize the minds of every boy and girl of school age with the principles of the change.

No more effectual means could be devised than the one proposed. The children attending school would not simply get their minds imbued with the new ideas, but they would in many cases carry them to their homes, and thus educate their fathers and mothers. Thus, in a very few years, certainly by the time children of now average school age reach manhood, the community would be prepared to demand the change.

With the view of bringing the subject before the schools of the country, the Chairman of the Committee has prepared a treatise on Time and its Notations, which he has pleasure in placing at the disposal of the Society.

It was in no small degree through the public-spirited efforts of the American Society of Civil Engineers that Standard Time was introduced in North America. The advantages of that first step in Time Reform are acknowledged to be incalculable. The second step, the general adoption of the twenty-four hour notation, is not less important, and it will only be from further sustained efforts that this rational change will be accomplished.

It is recommended that the Treatise now submitted be brought to the notice of the Bureau of Education at Washington, with the request that it be generally disseminated, and that Superintendents of Education in the several States and cities be invited to enjoin teachers under their supervision to give special lectures and lessons on the subject of which it treats to the pupils attending the schools.

Through the medium of the schools it is believed that in a comparatively few years the people will have their minds familiarized with the whole question, and that if this course be followed it will eventually lead to the adoption of an "American Normal Time," by which perfect uniformity of reckoning will prevail throughout the Continent.

SANDFORD FLEMING,
Chairman.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—August-September, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

(No meetings of the Society were held in August.)

OF THE SOCIETY.

SEPTEMBER 5TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair; John Bogart, Secretary.

Ballots for membership were canvassed, and the following candidates declared elected. As Members: William James Baldwin, New York City; Elbridge Leonard Brown, Brockton, Mass.; Edward Bertie Codwise, Kingston, N. Y.; Walter Whaley Curts, Fort Madison, Ia.; Arthur Powis Herbert, Mexico, Mex.; Edward Maguire, Willetts Point, N. Y.; Arthur John Mason, Kansas City, Mo.; Charles Henry Nash, Bloomfield, N. J.; William Scherzer, Chicago, Ill.; William Humphrey Wightman, Palouse, Wash. As Associate: William Gibson, Jr., New York City. As Juniors: St. John Clarke, High Bridge, N. Y.; Walter H. Gahagen, La Salle, Ill.; Mason Delano Pratt, Johnstown, Pa.

The report of the Committee to formulate Recommendations with reference to Grades and Titles of Engineers on Public Works was presented. (Printed below.)

A paper by Edward E. Magovern, Jun., Am. Soc. C. E., on "The Theory of Aqua Ammonia Engines, with Results of Tests upon an Engine of this Type, Operating an Edison Incandescent Lighting Plant," was presented.

SEPTEMBER 19TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair; John Bogart, Secretary.

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Discussions on the paper by Colonel William P. Craighill, M. Am. Soc. C. E. "Some Observations on the Subject of the Improvement of Several of the Rivers of the Atlantic Coast," by Capt. W. H. Bixby, F. Collingwood and Lieut. O. M. Carter, Members of the Society, were presented, and the subject was discussed by Messrs. Emery, H. W. Brinckerhoff, Hamilton, A. O. Wilson, Boller, Bogart and Flagg.

OF THE BOARD OF DIRECTION.

AUGUST 1ST, 1888.—Applications were considered.

SEPTEMBER 6TH, 1888.—Applications were considered. Financial business transacted.

Messrs. Frederic Graff, Theodore Cooper and E. N. K. Talcott were appointed the Board of Censors to award the Norman Medal.

Messrs. B. M. Harrod and Frank H. Hambleton were appointed, with the Secretary, the Committee to award the Rowland Prize.

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REPORT OF COMMITTEE TO FORMULATE RECOMMENDATIONS WITH REFERENCE TO GRADES AND TITLES OF ENGINEERS ON PUBLIC WORKS.

PRESENTED AT THE ANNUAL CONVENTION, JUNE 29TH, 1888.

To the American Society of Civil Engineers,
Mr. JOHN BOGART, *Secretary.*

The Committee appointed by the President at the last Annual Meeting, to formulate recommendations with reference to the grades and titles of engineers on public works, after having by correspondence and otherwise made themselves acquainted with the wishes and opinions of many of the members of the Society, make the following report:

First.—That the title of Chief Engineer apply only to one having supreme direction of all engineering matters relating to the work in charge.

Second.—Whenever the work under the Chief Engineer is of such magnitude as in his opinion will not admit of his giving it proper attention in the field, or afford him sufficient opportunity to communicate with the Division Engineer or Engineers, hereinafter mentioned, then we recommend the creation of the office of Chief Assistant Engineer, who will represent the Chief Engineer in his duties, either at the chief office, or in the field.

Third.—Whenever the work in hand is of magnitude that will not permit the Chief Engineer, or his Chief Assistant, to give the proper attention and directions to the Resident Engineers, hereinafter mentioned, then we recommend the title of Division Engineer, the same to apply to one who shall act directly under and be subject to the direction of the Chief Engineer, or his Chief Assistant, in case one is required.

The duties of the Division Engineer will be to give all orders and directions to Resident Engineers, in carrying out the orders and directions conveyed to him from the Chief or Chief Assistant Engineer.

Fourth.—Resident Engineers to be considered those having direct supervision of work under progress, the extent of which should not be greater than can receive their daily supervision and examination.

Fifth.—We also recommend that the title of Assistant Engineer be applied to such other engineers as may be employed directly under the Chief, Chief Assistant, Division, or Resident Engineers in topographical work, plans of structures, or instrumental work in the field.

This title should in no way be construed as to apply to the subordinates in an engineer corps, such as rodmen, and those in an inferior position in the corps.

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Sixth.—We further advise the use of the title of Locating Engineer, to apply to those having had extended experience in this most difficult and important branch of the profession, to be successful in which demands not only ability, but what may be termed genius of high order.

Seventh.—We deprecate the too frequent use of the title Consulting Engineer, by those of little experience and not acknowledged ability. We believe this title should be employed and enjoyed only by those of our profession, who, through their long and successful experience, are acknowledged authority on questions belonging to their special calling. Ordinarily, the duties of the Consulting Engineer will be confined to giving opinions, or formulating plans from facts presented, and to acting in conjunction with the Chief Engineer, or directly with the party seeking advice.

Eighth.—Engineers confining their work to special departments, and having the experience necessary to entitle such use, may well employ titles which will distinctively indicate their specialty, such as hydraulic, sanitary, electrical, etc., engineers.

Ninth.—We recommend the title Chief Engineer for the engineer having responsible charge of the public works of a city.

Tenth.—Whenever in any of the above cases the work in charge of the Chief Engineer is not of sufficient magnitude to require a Chief Assistant or Division Engineer, the Resident Engineer shall be considered as standing next to the Chief Engineer, it being understood that his duty is such that he can give personal and daily supervision to all work in his charge.

The above is respectfully submitted in the belief that we have complied with your request, in so far as it is advisable to recommend titles for present use.

D. J. WHITTEMORE,
A. A. ROBINSON,
J. L. RANDOLPH.

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ADDITIONS TO

LIBRARY AND MUSEUM.

From American Institute of Mining Engineers, Dr. R. W. Raymond, Secretary, New York City:

Proceedings of the Forty-eighth Meeting, Utah and Montana, July, 1887.

Gold and Silver Mining in Utah. O. J. Hollister.

History of the Ontario Mine, Park City, Utah. Thomas J. Almy.

Notes on the Geology of Butte, Montana. S. F. Emmons.

Further Notes on the Hydrometallurgy of Copper. T. Sterry Hunt.

Engineering Relations of the Yellowstone Park. Dr. Theodore B. Comstock.

Notes on the Region North of the Vermillion Lake District, in British America. Dr. Theodore B. Comstock.

Inorganic Standards for the Colorimetric Carbon Test. Theodore W. Robinson.

The Canadian Iron Trade. James Herbert Bartlett.

The Kaiping Coal-Mine, North China. J. M. Sillman.

Proceedings of the Forty-ninth Meeting, Duluth, Minn., July, 1887.

Ore and Matte-Roasting in Utah. Richard H. Terhune.

The Old Telegraph Mine, Utah. G. Lavagnino.

Siver-Mining and Milling at Butte, Montana. William P. Blake.

Silver Ingot Melting at the Mint of the United States, at New Orleans. F. F. Claussen.

Two Conditions of Phosphorus in Iron. Second Paper. Bryon W. Cheever.

A Chrystalline Sub-Sulphide of Iron and Nickel. J. B. Mackintosh.

A New Discovery of Carbonate Iron-Ore at Enterprise, Miss. Alfred F. Brainerd.

The Resources of the Lake Superior Region. John Birkinbine.

The Chlorination of Gold-Bearing Sulphides. E. Gybbon Spilsbury.

The Rainbow Lode, Butte City, Montana. William P. Blake.

Experiments Illustrating the Descent of the Charge in an Iron Blast Furnace.

The Incline Railway at Lookout Mountain. W. H. Adams.

The Association of Minerals in the Gagnow Vein, Butte City, Montana. Richard Pearce.

The Sulphur-Deposits of Southern Utah. A. Faber Du Faur.

Silica Determinations in Blast Furnace Cinder. Clemens Jones, B. S.

Gilsonite or Unitahite; a New Variety of Asphaltum from the Unitah Mountains, Utah. Joseph M. Locke.

The Chapin Iron-Mine, Lake Superior. Per Larsson.

Wire Rope Haulage and its Application to Mining. Frank C. Roberts.

Notes on the General Treatment of the Southern Gold Ores, and Experiments in Matting Iron Sulphides. E. Gybbon Spilsbury.

American Mining Schools. Professor R. H Richards.

Microscopic Structure of Steel Rails. F. Lynwood Garrison.

Comparison of Some Southern Cokes and Iron Ores. A. S. McCreath and E. V. D. d'Invilliers.

A Water-Cooled Gas Producer. W. J. Taylor.

Note on the Formation of Coal from Mine Timber. E. S. Moffat.

Rail-Sections. W. F. Maltes.

Catalogue, List of Members, Rules, etc.

Transactions. Vol. XV, May, 1886, to February, 1887, inclusive.

From American Institute of Electrical Engineers, R. W. Pope, Secretary, New York City:

Transactions, Vol. IV., and Nos. 1, 2 and 3 Vol. V.

From Aqueduct Commissioners, New York:

Report of the Aqueduct Commissioners, from 1883 to January, 1887.

From S. G. Artingstall, Chicago, Ill.:

Three Specifications for the Construction of a Water Tunnel eight feet in diameter, from a point on the Lake Park, to be built in an easterly direction under the bed of Lake Michigan, to a distance of about four miles.

From Benjamin Baker, London:

Bridging the Frith of Forth.

From Robert Bassel, Technical Attache of the Imperial German Legation, Washington, D. C.:

Instructions as to the Inspection of Bridges of the German Government Railways (in German), Magdeberg, 1883.

From M. J. Baudry, Paris, France:

Notes sur le Service du Material et de la Traction de quelques Chemins de fer Americains. Charles Baudry. Paris, 1887.

From Commander J. R. Bartlett, U. S. N., Washington, D. C.:

Annual Report of the Hydrographer to the Bureau of Navigation for the Fiscal Year ending June 30th, 1887.

From Kgl. Regeirungs Baumeister Bassel, Technical Attache of the German Legation. Washington, D. C.:

Weber Schneeveruchungen. Bassel. Berlin, 1887.

From G. H. Benzenberg, Milwaukee, Wis.:

Annual Report of the Board of Public Works and City Engineer of the City of Milwaukee, Wis., for the year ending December 31st, 1886.

From H. Bissel, Salem, Mass.:

Fifty-fourth Annual Report of the Boston and Maine Railroad for the year ending September 30th, 1887.

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From John Bogart, New York City:
Annual Report of the State Engineer and Surveyor of the Canals of New York for the Fiscal Year ending September 30th, 1885.
Annual Report of the State Engineer and Surveyor of the State of New York for the year ending September 30th, 1861.
Fourth Annual Report of the Bureau of Statistics of Labor of the State of New York for the year 1886.

From G. A. Bolrick, Boston, Mass.:
A Treatise on School Furniture; Its Construction in Compliance with Hygienic Requirements, etc. G. A. Bolrick, Boston, 1887.

From Aug. J. Bowie, Jr., San Francisco, Cal.:
Transactions of the Technical Society of the Pacific Coast for February and March, 1887.

From Bureau of Education, Washington, D. C.:
Report of the Commissioners of Education for the years 1884–85.

From Bureau of Navigation, Navy Department, Washington, D. C.:
Pilot Chart of the North Atlantic Ocean from June to December, 1887, inclusive.

From the Canadian Society of Civil Engineers, Henry T. Bovey, Secretary, Montreal, Canada:
Transactions, Vol. I, March to June, 1887; also Charter, By-Laws and List of Members.

From the Commissioners of the State Reservation at Niagara, David Gray, Treasurer and Secretary, Buffalo, N. Y.:
Supplemental and Third Annual Report of the Commissioners of the State Reservation at Niagara.

From Prof. George H. Cook, State Geologist. New Brunswick, N. J.:
Atlas Sheets Nos. 5. 10, 14 and 15 of the Geological Survey of New Jersey.
Annual Reports of the State Geologist for the years 1869, '70, '71, '72, '75 and '77.

From Hon. Washington Ford, Chief of Bureau of Statistics, Washington, D. C.:
Reports from the Consuls of the United States for 1887.
Statistical Abstract from Foreign countries for each year from 1873 to 1885. First Issue.
Index to the Consular Reports, 1880–85.

From Senor Don Francisco de Garay, Mexico, Mexico:
A Memoir of the late Captain James B. Eads, Mexico, 1887.

From Edward B. Dorsey, New York City:
Midland Railway Time Tables for July, August and September, 1887,
Time Tables of the London and Northwestern Railways and Connections.
Railway Returns for England and Wales, Scotland and Ireland for the year 1886.
English and American Railroads Compared, with Discussion. E. B. Dorsey, New York, 1887.

From J. H. Decker, Secretary American Water Works Association, Hannibal, Mo.:
Report of Proceedings of the Seventh Annual Meeting of the American Water Works Association, held at Minneapolis, Minn., July 13, 14 and 15, 1887.

From Gen. James C. Duane, Chief of Engineers, U.S. A., Washington, D. C.:
Advertisements, Proposals and Specifications, as follows:
For Removing Ledge and for Dredging in Saco River, Maine.
For Approximate Quantity of Material Required for Repair of the Pile and Piers of the Revetment at Port Clinton Harbor, Ohio.
Extending the Dike in New Haven Harbor, Conn.
For Furnishing Material at Black Lake Harbor, Mich.
For Improving New York Harbor, N. Y.
For Furnishing Material at Saugatuck, Mich.
For Dredging in Thames River, Connecticut.
For Furnishing a Tug for Use at Michigan City, Ind.
For Furnishing Material at White River Harbor, Michigan.
For Furnishing One Dredge, One Tug and Two Dump Scows, for use in improving Saint Mary's River, Michigan.
Improvement of Potomac River, near Washington, D. C.
Removal of a Wreck in Rappahannock River, Virginia.
For Hull and Upper Works for Stern Wheel Launch for the Mississippi River Commission.
For Supply of Wood and Iron.
For Furnishing Timber, Iron and Stone for Green Bay Harbor, Wis.
For Improving Maurice River, New Jersey.
For Timber, Iron and Stone, for Piers and Breakwater at Buffalo, Dunkirk, Oak Orchard, Olcott, Wilson Harbors, New York and Erie Harbor, Pa.
For Iron for Lock No. 2, Great Kanawha River, W. Va.
For Improvement of Potomac River, near Washington, D. C., Virginia Channel.
For Furnishing Rock or Stone for Work in the Atchafalaya River.
For Lock No. 8, Monongahela River.
For Removal of the Wreck of the Steam Propeller "J. Van Doren," now lying in Broadkiln River, Del.
For Improving Ship Channel in Galveston Bay, Texas.
For Building a Pile Dike at Saugerties Harbor, New York.
For Construction of Keeper's Dwelling, at Lock No. 4.
For Dredging in the Calumet River, "between the Forks and One-Half Mile, east of Hammond, Indiana."
For Construction of Two Dump Scows.
Improvement of Kentucky River, Kentucky, for Stone for Lock No. 6.
For Willow Brush and Piles for use at Memphis, Tenn.
For Building a Steam Snag-boat for the Improvement of the Oconee and Ocmulgee Rivers, Georgia.
For Dredging "Straight Channel," through Maumee Bay, from the Mouth of Maumee River.

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For Construction of Eastern Branch Bridge, D. C.
For Materials for Wharf at Fort Monroe, Va.
For Improving Raritan Bay, New Jersey.
For Removing Ledge from Moore-a-bee Bar, near Jonesport, Maine.
For Timber for No. 2 Lock Gates, Great Kanawha River, W. Va.
For Kempe Levee and Deer Park Levee.
For Construction of Breakwater at Gorden's Landing, Lake Champlain.
For Iron Wharf at Fort Monroe, Va.
For Hull for Dredge.
For Stone, Sand, Cement and Iron.
For Furnishing Material and doing the Work of Building One Wing Dam at Whitney's Bar.
For Construction of Breakwater at Burlington Harbor, Vermont.
For the Improvement of Biloxi Harbor, Miss.
For Improving Vicksburg Harbor, Miss.
For Removing Balson's Ledge, Gloucester Harbor, Mass.
For Improving Warior River, Ala.
For the Improvement of Pascagoula River, Miss.
For Protecting the Shore of Aransas, Texas, from Erosion.
For Improving Entrance to Cross Bay, Oregon.
Report of Engineers Relative to Bridging the Arthur Kill.
Report relative to Removal of the Sand Bar Formed against the Piers of the Railway Bridge across Red River, at Shreveport, Louisiana.
Annual Report upon the Improvement of certain Rivers and Harbors in Maryland, Virginia, and North Carolina.
Annual Report of the Missouri River Commission, together with Appendices A and B, for the Fiscal Year ending June 30th, 1886.
A list of the names and places of residence of Civil Engineers employed on works of River and Harbor Improvement.
A Communication from the Mississippi River Commission, in reference to the Works of Protection to the Banks of that River; also to the failure to make provision for the expenses of the Commission.
A Resolution of the Board of Managers of the Lake Carriers' Association of Buffalo, N. Y., favoring the acquisition by the United States of the Sturgeon Bay and Lake Michigan Ship Canals.

From H. A. Duc, Charleston, S. C.:
A Descriptive Narrative of the Earthquake of August 31st, 1886, with Notes of Scientific Investigations. Carl McKinley, Charleston, 1887.
Year Book of City of Charleston, South Carolina, 1886.

From Dyckerhoff and Söhne, Amöneburg, Germany:
Protokol der Verhandlungen des Vereins deutscher Cement-Fabrikanten und der Section für Cement des Deutschen Vereins für Fabrikation von Ziegeln, Thonwaaren, Kalk und Cement, am 25 und 26 Februar, 1887. Berlin, 1887.

From *Engineering*, London, England:
A Treatise upon Cable or Rope Traction as Applied to the Working of Street and other Railways. J. Bucknall Smith, London, 1887.

From B. E. Fernow, Chief of Forestry Division, Washington, D. C.:
Report on the Relation of Railroads to Forest Supplies and Forestry, together with Appendices.

From Desmond FitzGerald, Brookline, Mass.:
Report on the Capacity of the Sudbury River and Lake Cochituate Water Sheds in Time of Drought.

From A. D. Foote, Boise City, Idaho:
Report on the Irrigating and Reclaiming of Certain Desert Lands in Idaho, and other Projects connected therewith. A. D. Foote, New York, 1887.

From M. N. Forney, New York City:
Annual Reports of the Master Car Builders Association for the years 1867, '68, '69, '70, '71, '72, '74, '75, '77, '78, '79, '80, '81 and '86.

From Le Marquis de Galigny, Versailles, France:
Recherches Theoriques et Experimentales sur les Oxellation de l'Eau et les Machines Hydrauliques a Colonnes Liquides Oscillantes Archuit Planches. Parte Premiere, and Seconda, par Le M. Anotete de Galigny, Paris, France, 1883.

From C. C. Gilman, Chicago, Ill.:
Facsimile of United States Patents issued to Charles Caroll Gilman, Protecting their Manufacture and Application for Architectural and Specific Uses, 1887.

From John L. Gill, Jr., Philadelphia, Penn.:
Screw Threads.

From William Hamilton, Toronto, Canada:
Annual Report of the Superintendent of the Toronto Water Works for the year ending 31st December, 1886.

From Albert B. Hill, New Haven, Conn.:
Annual Reports of the Department of the Board of Public Works, City of New Haven, Conn., for the year 1886.

From W. H. Hitchcock, New York City:
Railroad Gazette, June 28, July, August, September, October 4, 1878, and January 18, 1884.

From William A. Ingham, Secretary Board of Commissioners Second Geological Survey of Pennsylvania:
Annual Report of the Geological Survey of Pennsylvania for 1886 Part I, Pittsburgh Coal Region.

From Institution of Civil Engineers, James Forest, Secretary, London:
Experiments on the Strength of Iron and Steel in Shear and Tension. John Platt and Robert Francis Hayward.
On the Removal of Sand from Underneath the Liverpool Landing Stage. William Henry Le Mesuvier.
The Use of Cast-steel in Locomotive Engines. Alfred John Hill.
Notes on the Detection of Leaks in Water Mains. New River Company, Joseph Frances. East London Water Works Company, William Booth Bryan. Grand Junction Water Works Company, Alexander Fraser. Southwork and Vauxhall Water Company, James William Restler.
River Tees Improvements. John Fowler.

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The Lumber Industry of Ontario. Matthew Joseph Butler

Flario-Mills and their Machinery. Alfred Chatterton.

The Sinking of Two Pits at Gueisenau, Dortmund. H. Tomson.

South African Rivers South of the Orange and Vaul. William Blomefield Tripp.

On the Extension of the Ceylon Government Railway from Nawalapitiya to Nanu Oya. Francis John Waring.

Abstract of Papers in Foreign Transactions and Periodicals.

Dredging Operations and Appliances. John James Webster (with an abstract of the Discussion upon the paper).

The Moltens Reservoir. Charles John Wood.

Recent Researches in Friction, Part II. John Goodman.

Gas Power Compared with Steam Power. Joseph Emerson Dorson.

Water Supply in Cape Colony. John George Gamble.

On the Manufacture of Salt near Middlesbrough. Sir Lowthian Bell (with an abstract of the Discussion upon the paper).

The Conversion of Timber by Circular-saws and by Band-saws in the Pine Growing Districts of the United States of America. Lewis Henry Ransome (with an abstract of the Discussion upon the paper).

Water Supply from Wells, comprising the following papers:

I.—Chuck Springs in the London Basin. Illustrated by the Newbury, Workingham, Leatherhead and Rickmansworth Water Works. John William Grovers.

II.—Borings in the Chalk at Bushey, Herts. William Fox.

III.—On a Bore Hill in Leicestershire. Thomas Sullock Stooke.

IV.—The Wells and Borings of the Southampton Water Works. William Matthews (with an abstract of the Discussion upon the papers).

Printing Machinery. Edward Amott Clowers (with an abstract of the Discussion upon the paper).

The Treatment of Gun Steel Coal. Eardley Maitland (with an abstract of the Discussion upon the paper).

The Yanegase Yama Tunnel on the Touruga Nagahame Railway, Japan. Knishe Hasegana.

Discharge of Water Over Weirs. Charles Slagg.

Notes upon Railway Construction in the River Plats, Argentine Republic. Thomas Holmes Perry.

Minutes of Proceedings, Vol. LXXXIX, Session 1886-87, Part III.

Vol. XC, 1886-87, Part IV.

Brief Subject Index, Vols. LIX to XC.

Charter, Supplement Charter, By-Laws, and List of Members, August 3d, 1887.

From Institution of Engineers and Shipbuilders in Scotland. W. J. Millar, Secretary, Glasgow, Scotland:

Transactions, Vol. XXX, 1886-87.

From J. B. Johnson, St. Louis, Mo.:

The Theory and Practice of Surveying. J. B. Johnson, New York, 1887.

From John Kennedy, Montreal, Canada:

Annual Reports of the Harbor Commissioners of Montreal for the year 1886.

From Louis H. Knapp, Buffalo, N. Y.:

Eighteenth Annual Report of the Buffalo City Water Works for the year 1886.

From Albert Krause, Buffalo, N. Y.:

Annual Report of the City Engineer of Buffalo, New York, for the year 1886.

From Lehigh Valley Creosoting Works, Perth Amboy, N. J.:

Four Photographs of Lehigh Valley Creosoting Works, Perth Amboy, N. J.

From E. N. Lewis, Manager Official Railway List, Chicago, Ills.:

The Official Railway List for 1888.

From Liverpool Engineering Society, Thomas L. Miller, Secretary, Liverpool, Eng.:

Annual Report and Statement of Accounts for 1886. Rules of the Society and List of Members.

From Arthur Marichal, Philadelphia, Penn.:

The Gileppe Dam. Synopsis of a Description and Discussion.

Blue Print on the Construction of Reservoir Walls.

From the Maverick National Bank, Boston, Mass.:

The Maverick National Bank Manual for July 1st, 1887.

From Mansfield Merriman, Bethlehem, Pa.:

A Text Book on Roofs and Bridges. Part I. Stresses in Simple Trusses. Mansfield Merriman, New York, 1887.

From Henry C. Myer, New York City:

Water Waste Prevention; Its Importance and the Evils Due to Neglect. Henry C. Meyer, New York, 1885.

From George S. Morison, New York City:

Tenth Census of the United States, Vol. XV.

From Gilbert Murdoch, St. John, N. B., Canada:

Annual Accounts and Statements, with Superintendent's and Auditor's Reports of Sewerage and Water Supply for the City of Saint John (East-side) and Town of Portland, for the year ending December 31st, 1886.

From New York Meteorological Observatory, Department of Public Parks. Dr. Daniel Draper, Director, New York City:

Abstracts of Registers from Self-recording Instruments. May, June, July, August, September, October, November and December, 1887, and Annual Report for the year ending December 31st, 1886.

From Professor Simon Newcomb, U. S. Navy, Superintendent, Washington, D. C.:

The American Ephmeris and Nautical Almanac for the year 1890. First Edition.

From John Neuman, London, England:

Notes on Concrete and Works in Concrete. John Neuman, London, 1887.

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From New York Library Club :

Union List of Periodicals currently received by the New York and Brooklyn Libraries. New York, 1887.

From E. P. North, New York City :

Speech of Hon. Warner Miller, of New York, on Internal Improvements; their Value to the Country, and to the Individual Farmer and Laborer.

Annual Report of the State Geologist of New Jersey for the year 1883.

Annual Report of the Chief Engineer of the Philadelphia Water Department for the year 1883.

Communication from Board of Health Relative to the Condition of the New Aqueduct, New York.

The Design Generally of Iron Bridges of Very Large Span for Railway Traffic. Thomas Curtis Clarke.

Lancaster Water Works Extension. James Manreigh.

Dredging and other Plant employed at the Quebec Harbor Works. St. George James Boswell.

The Design and Construction of the South Reserve Piers and Floating Landing Stage at Birkenhead. Charles Graham Smith.

Deep Mining of Coal in South Wales. T. Foster Brown and G. F. Adams.

On the Sinking of Two Shafts at Mandew for the Whitburn Coal Company. John Daglish.

On the Diamond Fields and Mines of Kimberley, South Africa. James Noah Paxman.

Report of the Department of Public Works of the City of New York for the quarters ending March 31st, June 30th, September 30th and December 31st, 1882–1883, 1884 and 1885.

First Annual Report of the Department of Public Works of the City of Chicago for the Fiscal Year ending December 31st, 1876.

From Osgood Dredge Company Albany, N. Y.:

Seven Framed Photographs of Dredges.

From A. B. Paine, Poughkeepsie, N.Y.:

Six Photographs of Progress of Construction of Poughkeepsie Bridge.

From G. W. Pearsons, Kansas City, Mo.:

Three Photographs of Kansas City Water Works.

From Captain A. E. Piorkowski :

Gruson's Chilled Cast-Iron Armor. Julius von Schütz. London, 1887.

From E. Poutzen, Paris, France:

Observations de M. E. Poutzen en répouse au Rapport de M. Durand Claye au Sujet du Systeme-Waring. Vienne, 1887.

La Traversée des Alpes par le Chemin de Fer du Simplon. R. Gentilini. Paris, 1886.

Les Voris de Communication en Cochin-China. R. Gentilini. Paris, 1886.

From the Pratt and Whitney Co., Hartford, Conn.:

Standards of Length and other Practical Applications.

From Charles E. Pugh, Philadelphia, Penn :

Fortieth Annual Report of the Board of Directors of the Pennsylvania Railroad Company to the Stockholders. Presented at the Meeting held November 8th, 1887

From George W. Rafter, Rochester, N. Y.:

On the Use of the Amplifier, with Observations on the Theory and Practice of Photo-Micrography suggested by the Design of a New Photo-Micro Camera.

From Railroad Commissioners of Massachusetts:

Special Report by the Massachusetts Board of Railroad Commissioners in Relation to the Disaster on Monday, March 14, 1887, on the Dedham Branch of the Boston and Providence Railroad.

From Railroad Commissioners of the State of New York :

Fourth Annual Report of the Board of Railroad Commissioners of the State of New York for the Fiscal Year ending September 30th, 1886. Vols. I and II.

From H. B. Roosevelt. President Shell Fish Commission, New York City :

Second Report of the Oyster Investigations and of Survey of Oyster Territory for the years 1885 and 1886. Eugene G. Blackford, Albany, 1887.

Report of the Commissioners of Fisheries of the State of New York in charge of the Oyster Investigation.

From Hon. Senor Romero, Mexican Minister to the United States, New York City.

The Organization and Management of Public Libraries. William F. Poole, Chicago, Illinois.

Statistics of Public Libraries in the United States.

Reports of the Committee of Investigation sent in 1873 by the Mexican Government to the Frontier of Texas. New York, 1875.

The Republic of Mexico in 1876. Antonio Garcia. Cubas, Mexico, 1876.

From Leo von Rosenberg, New York City:

The Vosburg Tunnel. A Description of its Construction. Illustrated. Leo von Rosenberg, New York, 1887.

From J. F. L. Schneider, Secretary Polytechnique School, Delft:

Annales de L'Ecole Polytechnique de Delft. Nos. 1, 2, 3 and 4, 1885; No. 1, 1886, and Nos. 1, 2, 3 and 4, 1887.

From Collingwood Schreiber, Ottawa, Canada:

Annual Report of the Minister of Railways and Canals, for the Fiscal Year from 1st July, 1885, to 30th June, 1886.

Railway Statistics of Canada for 1886, with Map showing the Railways of Canada to accompany Annual Report on Railway Statistics.

From William P. Shinn, Boston, Mass ;

Twelfth Annual Report to Stockholders of the New York and New England Railroad Company, made at the Annual Meeting, Tuesday, December 13th, 1887.

From W. F. Shunk, New York City:

Memorial of Colonel James Worrall, Civil Engineer, with an Obituary Postscript, by a Friend.

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From R. E. Smiley, Watertown, N. Y.:
Annual Reports of the Board of Directors of the Rome, Watertown and Ogdensburg Railroad Company for the Fiscal Years 1883–84 and 1885, and Supplementary Report, June 1st 1884.

From Oberlin Smith, Bridgeton, N. J.:
If Material Why Moral?

From Smithsonian Institution, Washington, D. C.:
Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures and Conditions of the Institution to July, 1885.

From Samuel Spencer, Baltimore, Md:
Service Report on Technical Education, with Special Reference to the Baltimore and Ohio Railroad Service. Dr. W. T. Barnard, Baltimore, 1887.

From Professor George F. Swain, Boston, Mass.:
Abstract of the Proceedings of the Society of Arts, with List of Officers and Members of the Twenty-fifth Year, 1886–87.

From W. R. Taylor, Philadelphia, Penn.:
Annual Reports of the P. and R. R. R. for the years 1870 to 1886, inclusive; also Statement of the present condition of the P. and R. R. R. and the P. and R. Level Iron Company, with Plans for their Financial Reorganization. Franklin B. Gowen, President.

From John Thomson, New York City:
The Thomson Water Meter.

From Ernest Toeche, Berlin, Germany:
Eisen und Eisenkonstruktionen. Part I. G. Mehrtens, Berlin, 1887.

From Henry R. Towne, Stamford, Conn.:
Album of Crane Designs.

From John C. Trautwine, Jr., Philadelphia, Penn.:
Trautwine's Civil Engineer's Pocket Book. New Edition. 1887.
The Field Practice of Laying Out Circular Curves for Railroads. New York, 1887.
A Method of Calculating the Cubic Contents of Excavations and Embankments by the aid of Diagrams, together with Directions for Estimating the Cost of Earthwork. John C. Trautwine. New York, 1887.

From S. E. Tinkham, Secretary Boston Society of Civil Engineers, Boston, Mass.:
Constitution and By-Laws and List of Members. September, 1887.

From B. G. Underwood, New York City:
The Scientific American Supplement. New Catalogue of Valuable Papers.

From United States Geological Survey, Washington, D. C.:
Sixteen Atlas Sheets of the United States Geological Survey.
Sixth Annual Report of the United States Geological Survey for the years 1884–85. J. W. Powell, Washington, D. C., 1885.
Geology and Mining Industry of Leadville. S. E. Emmons.
Mineral Resources of the United States. 1886.
Bulletin of the United States Geological Survey, Nos. 34, 35, 36, 37, 38 and 39.

From U. S. Naval Observatory, Washington, D. C.:
Observations made during the year 1883 at the United States Naval Observatory.

From Robert Van Buren, Brooklyn, N. Y:
Annual Report of the Department of City Works of Brooklyn for the year 1886.

From Harry L. Van Zile, Albany, N.Y.:
The Heine Safety Boiler.

From Prof. J. A. L. Waddell, Kansas City, Mo.:
General Specification for Highway Bridges of Iron and Steel. J. A. L. Waddell, Kansas City, 1887.

From Arthur M. Wellington, New York City:
The Economic Theory of the Location of Railways. A. M. Wellington, New York, 1887.

From S. S Wheeler, New York City:
One Framed Chart of Wire Gauges.

From Frederick N. Willson, Princeton, N. J.:
A Completed Nomenclature for the Principal Roulettes. Frederick Newton Willson, New York, 1887.

From O. S. Wilson, Kenka, N. Y.:
The Final Results of the Triangulation of the New York State Survey, with Eleventh Annual Report of the Commissioners of the Survey.

From other sources:
Memoir of James Buchanan Eads.
Tehuantepec Ship Railway. Answer of James B. Eads correcting the Erroneous Statements of the Promoters of the Nicaragua Canal Scheme.
Concession from the Mexican Government to James B Eads for the Construction of a Ship Railway across the Isthmus of Tehuantepec, May 28th, 1881. St. Louis, 1881.
Contract and Specifications for Building an Iron Pier at Marine Park for the Department of Parks of the City of Boston. June, 1887.
The Lamb Prize Essays of the American Public Health Association. An Appendix. Second Edition. Concord, N. H, 1886.
The Russian Petroleum Industry B-Redwova. Manchester, 1885.
Shall the Erie Canal Look to the Federal Government for its Support, as advocated by the Republican Platform? G. Bleecker Miller. New York, 1887.
The State's Canal Policy. Hon. William M. Evarts.
The Railways of Brazil. John C. Brainard. Chicago, 1887.
Williams' Estate, Description and Advantages.
Physiographical Map of North Carolina.
Report of the Committee on Over-head Wires to the Board of Electrical Control.
Robinson's Atlas of the City of New York.
Proceedings of the Association of Dominion Land Surveyors at its Fourth Annual Meeting, held at Ottawa, Canada, March 8th and 9th, 1887.

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LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BALDWIN, WILLIAM JAMES	86 Fulton st., New York City	Sept. 5, 1888
CODWISE, EDWARD BERTIE	Chief Engineer Ulster and Delaware R'y, Kingston, N. Y.	Sept. 5, 1888
CURTIS, WALTER WHALEY	560 Drake Block, St. Paul, Minn.	Sept. 5, 1888
HERBERT, ARTHUR POWIS	Mexican National Construction Co., Ortega 28, Mexico, Mexico	Sept. 5, 1888
MAGUIRE, EDWARD	Captain Corps of Engineers, Willetts Point, N. Y.	Sept. 5, 1888
MASON, ARTHUR JOHN	1423 Jefferson st., Kansas City, Mo.	Sept. 5, 1888
SCHERZER, WILLIAM	159 Home Insurance Building, Chicago, Ill.	Sept. 5, 1888
WIGHTMAN, WILLARD HUMPHREY	Assistant Engineer Spokane and Palouse R'y, Genesee, Idaho	Sept. 5, 1888

ASSOCIATE.

GIBSON, WILLIAM, Jr.	84 Fulton st., New York City	Sept. 5, 1888

JUNIORS.

CLARKE, ST. JOHN	(Care Hoffman & Bates), Portland, Ore.	Sept. 5, 1888
GAHAGAN, WALTER H.	Troy, Ohio	Sept. 5, 1888
PRATT, MASON DELANO	Box 1003, Johnstown, Pa	Sept. 5, 1888

FELLOW.

GREEN, SAMUEL MAGEE	81 New Insurance Building, Milwaukee, Wis.	Sept. 5, 1888

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CHANGES AND CORRECTIONS.

MEMBERS.

APPLETON, ELLERY C .....Steep Creek, Strait of Canso, Nova Scotia.
BAKER, WILLIAM H.....Fitchburg, Mass.
BALDWIN, FRED. H..... (Care Chelsea Jute Mills), Fifteenth avenue and Twenty-fifth st., New York City.
BARNARD, AUGUSTUS P.....White City, Morris Co., Kans.
BERRIAN, RICHARD M.....255 West One Hundred and Twenty-eighth st., New York City.
CROWELL, J. FOSTER.....P. O. Box 1014, Geneva, N. Y.
DAGRON, JAMES G.....415 Broadway, New York City.
ENGLE, ROBERT L.....9 Hackberry st., Walnut Hills, Cincinnati, Ohio.
FILLEY, HIEL H.....1326 Forest avenue, Kansas City, Mo.
GIELOW, HENRY J ....992 Fourth avenue, Brooklyn, N. Y.
GRISWOLD, FRANK L.....451 Reconquista, Buenos Ayres, Argentine Republic.
HENNY, DAVID C.....Watertown, Dakota.
HINCKLEY, JOHN F.....Chief Engineer St. Louis, Arkansas and Texas Ry., 2017 Rutgers st., St. Louis, Mo.
HOUSTON, JOHN..... 1659 Lexington avenue, New York City.
HUDSON, JOHN R.....Box 42, Pomona, Cal.
HUNT, RANDALL.....San Francisco Contracting Co., 6 California st., San Francisco, Cal.
LE BARON, J. FRANCIS.....First Assistant Engineer in charge Expedition, Nicaragua Canal Construction Co., Greytown, Nicaragua, Central America.
LEDERLE, GEORGE A.....(Care Oregon Ry. and Navigation Co.), Riparia, Wash.
LUTZ, ULYSSES S.....Holmesburg, 23d Ward, Philadelphia, Pa.
MAIS, HENRY C.....Consulting Engineer, 29 Queen st., Melbourne, Victoria, Australia.
MARR, GEORGE A.....U. S. Engineer's Office, 1415 Washington ave., St. Louis, Mo.
MORRIS, MARSHALL.....530 West Walnut st., Louisville, Ky.
NEWMAN, ROBERT M.....415 W. Franklin st., Jackson, Mich.
PURDON, CHARLES D.....Louisville and Nashville Ry., Roost P. O., Bell Co., Ky.
SHAILER, ROBERT A.....(Shailer & Schniglau), 609 Phenix Building, Chicago, Ill.
SHANLY, JAMES M.....1251 Dorchester st., Montreal, Canada.
SIMPSON, GEORGE F.. .....P. O. Box 2, Yonkers, N. Y.
SNOW, J. PARKER.....Engineer's office, Boston and Maine R. R., Boston, Mass.
SONNE, OTTO F.....U. S. Engineer's office, Kansas City, Mo.
VAN BROCKLIN, MARTIN.....Elizabeth, Lincoln Co., Neb.
WALLACE, JOHN F.....Keithsburg, Ill.

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WHEELER, LEVI L.....Lock Box 132, Chicago, Ill.
WILLIAMSON, WM. GARNETT.....723 Monroe st., Montgomery, Ala.
WISNER, GEORGE Y.....Port Eads, La.

JUNIORS.

BUTTS, ELIJAH P.....Assistant Engineer, Snake River Bridge, Riparia, Wash.
GOLDSMITH, NATHANIEL O.....The Weir Frog Co. (Residence, 65 East Fourth st.), Cincinnati, Ohio.
HORTON, SANDFORD.....Niobrara, Knox Co., Neb.
RAASLOFF, HAROLD E. DE..... (Care Frazar & Co.), Yokohama, Japan.
TAPPAN, ROGER.....163 West Twenty-third st., New York City.

DEATHS.

HARBAUGH, SPRINGER.....Elected Fellow May 19, 1871; died December 8, 1887.
RANDOLPH, JAMES L.....Elected Member March 1, 1882; died September 17, 1888.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—October, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

OCTOBER 3D, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: William Barker Landreth, Schenectady, N. Y.; Charles Levings, Chicago, Ill.; Charles Abbott Locke, Nashville, Tenn.; Gouverneur Morris, Ardsley, N. Y.; George Thomas Nelles, Leavenworth, Kan.; Frank Chittenden Osborn, Pittsburgh, Pa.; Charles Francis Powell, St. Louis, Mo.; Nathaniel Edwards Russell, Lansingburg, N. Y.; Isaac Austin Smith, Lebanon, Ill.; Linton Waddell Stubbs, Monroe, La. As Juniors: Toragoro Kondo, Kansas City, Mo.; Frank Parsons Lant, New York City; Thomas Kennard Thomson, Pencoyd, Pa.

The Secretary announced the election to Fellowship, on September 5th, 1888, of Samuel Magee Green, of Milwaukee, Wis.

The death, on September 17th, 1888, of James L. Randolph, M. Am. Soc. C. E., was announced.

A paper by John A. Bensel, Jun. Am. Soc. C. E., on "The New Transfer Bridge at Harsimus Cove, Jersey City, N. J.," was read by the author and discussed by Messrs. Croes, John Bogart, Cooper and Bensel.

A paper by G. W. Cooley, M. Am. Soc. C. E., on "Experiments on the Stability of Bench Marks," was read by the Secretary and discussed

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by Messrs. Croes, John Bogart, Skinner, Odell, Fteley, H. W. Brinckerhoff and Brendlinger.

A written discussion on the paper by Col. Wm. P. Craighill, M. Am. Soc. C. E., on "Some Observations on the Improvement of Several of the Rivers of the Atlantic Coast," by C. P. E. Burgwyn, M. Am. Soc. C. E., was read by the Secretary.

OCTOBER 17TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

The report of the Nominating Committee was read, as follows:

NEW YORK, October 10th, 1888.

To the Board of Direction,

AMERICAN SOCIETY OF CIVIL ENGINEERS.

GENTLEMEN,—In accordance with Article 3d, Section 24 of By-Laws, the Nominating Committee appointed at the last Annual Convention, present the names of persons selected by them as candidates for Officers: For President, M. J. Becker, Pittsburgh, Pa.; Vice-President, A. Fteley, New York City; Vice-President, E. L. Corthell, Chicago, Ill.; Treasurer, George S. Greene, Jr., New York City; Secretary, John Bogart, New York City; Directors, Charles B. Brush, Hoboken, N. J.; Eliot C. Clarke, Boston, Mass.; Walter Katté, New York City; Robert E. McMath, St. Louis, Mo.; William P. Shinn, New York City.

Yours respectfully,

WILLIAM G. HAMILTON,
WILLIAM B. KNIGHT,
A. DEMPSTER,
A. B. ROGERS,
F. P. STEARNS,
Nominating Committee.

A paper by James D. Schuyler, M. Am. Soc. C. E., on "The Construction of the Sweetwater Dam," was read by the Secretary and discussed by Messrs. James B. Francis, H. W. Brinckerhoff, John Bogart, Wegman, W. B. Parsons, Croes, Buck, Fteley, Comstock, Striedinger, Hunt, and Brush.

OF THE BOARD OF DIRECTION.

OCTOBER 4TH, 1888.—Appropriations made. Applications considered. Nominations as Honorary Members of William J. McAlpine, Julius W. Adams and George S. Greene were presented. Financial business transacted.

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LIST OF MEMBERS.

ADDITIONS.

		Date of Election.
HONORARY MEMBERS.		
ADAMS, JULIUS W.*	(*Past President.*) Consulting Engineer Dep't Public Works, 31 Chambers st., New York City	Oct. 26, 1888
GREENE, GEORGE SEARS*	(*Past President.*) 31 Boyken st., Morristown, N. J	Oct. 26, 1888
MCALPINE, WILLIAM JARVIS†	(*Past President.*) New Brighton, Richmond Co., N. Y	Oct. 26, 1888
MEMBERS.		
FISHER, EDWIN AUGUSTUS	208 Troup st., Rochester, N. Y.	July 4, 1888
LOCKE, CHARLES ABBOTT	U. S. Engineer's office, Nashville, Tenn	Oct. 3, 1888
NELLES, GEORGE THOMAS	City Engineer, Leavenworth, Kans	Oct. 3, 1888
OSBORN, FRANK CHITTENDEN	Hamilton Building, Pittsburgh, Pa	Oct. 3, 1888
STUBBS, LINTON WADDELL	Resident Engineer Vicksburg, Shreveport and Pacific R. R., Monroe, La	Oct. 3, 1888
JUNIORS.		
FUERTES, JAMES HILLHOUSE	520 River st., Wichita, Kans.	May 2, 1888
KONDO, TORAGORO	118 West Sixth st., Kansas City, Mo	Oct. 3, 1888
LANT, FRANK PARSONS	252 West One Hundred and Thirty-third st., New York City	Oct. 3, 1888
WILLIAMS, WILLIAM PLUMB	Victoria Hotel, New York City	May 4, 1887

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

DUANE, JAMES C. ..... President Aqueduct Commission, 215 Stewart Building, New York City.

* Elected Member Nov. 5th, 1852. † Elected Member Feb. 2d, 1853.

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CORRESPONDING MEMBER.

PONTZEN, ERNEST.....3 Avenue du Coq (89 rue St. Lazare), Paris, France.

MEMBERS.

AULLS, HERBERT L.....Room 33, Pioneer Building, Denver, Colo.
BASSEL, ROBERT.....81 Bülow st., Berlin, W., Germany.
BLACK, WILLIAM M.....Captain Corps of Engineers U. S. A., Room 20, Fourth Floor, P. O. Building, Philadelphia, Pa.
BUTTERFIELD, FRANCIS E.....(Care B. Hebard), Bracketville, Kinney Co., Texas.
CISNEROS, FRANCIS J.....Barranquilla, U. S. Colombia.
DARRACH, CHARLES G.....(Wilson Bros. & Co.), Drexel Building, Philadelphia, Pa.
GODWIN, BRYANT.....54 Frankfort st., New York City.
GREENE, BENJAMIN D.....2 East Fifteenth st., New York City.
HARLOWE, CHARLES.....Duluth and Winnipeg R'y, Box 357, Cloquet, Minn.
HILLMAN, CHARLES F.....Civil Engineer, Box 185, Santiago, Chili.
JENNINGS, HENRY C.....Room 28, Barclay Block, Denver, Colo.
MCDONALD, HUNTER.....Engineer in charge Nashville, Chattanooga and St. Louis R'y, Lewisburgh, Marshall Co., Ky.
MORSE, CHARLES J.....Platoro, Conejos Co., Colo.
OCKERSON, JOHN A.....Vice-President and Manager Silver Age Mining and Milling Co., Idaho Springs, Colo.
PLAYLE, EDWARD F.....Hotel Winthrop, Seventh ave. and One Hundred and Twenty-fifth st., New York City.
POU, ARTHUR.....Chief Engineer Alabama Midland R'y, Bainbridge, Ga.
RICHARDSON, B. FRANK.....Division Engineer Baltimore and Ohio R. R., 2126 Wharton st., Philadelphia, Pa.
RUMBLE, WILLIAM.....(Care Hudson Suspension Bridge and New England R.R.), 38 Wall st., New York City.
SEAMAN, HENRY B.....(Care Wilson Bros. & Co.), Drexel Building, Philadelphia, Pa.
TALCOTT, THOMAS M. R.....First Vice-President Richmond and Danville R. R., Richmond, Va.
VANCE, HART.....120 W. Chestnut st., Louisville, Ky.
WETHERILL, WILLIAM C.....(Care King & Wetherill), Winchester, Frederick Co., Va.
WHEELER, ORLANDO B.....1415 Washington av., St. Louis, Mo.
WILSON, HENRY W.....Civil Engineer, Drexel Building, Philadelphia, Pa.
WILSON, JOHN A.....Civil Engineer, Drexel Building, Philadelphia, Pa.

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WILSON, JOSEPH M.....Civil Engineer and Architect, Drexel Building, Philadelphia, Pa.

JUNIORS.

BELL, GILBERT J.....Keithsburg, Ill.
BOOKER, BERNARD F.....Assistant Engineer Maintenance of Way Gulf, Colorado and Santa Fé R'y, Galveston, Texas.
CLARKSON, ROBERT C.....(Care Wilson Bros. & Co.), Drexel Building, Philadelphia, Pa.
HASBROUCK, CHARLES A.....(Care Chicago Forge and Bolt Co.), Chicago, Ill.
HOWE, HORACE J.....(Care New York, Lake Erie and Western R. R.), Susquehanna Pa.
NOYES, ELLIS B.....Assistant Engineer in Charge New York State Canals, Fort Edward, N. Y.
POTTER, ALEXANDER.....Lehigh University, South Bethlehem, Pa.
SMITH, MAXWELL.....(Care Keep Mfg. Co.), 809 Broadway, New York City.
YATES, PRESTON K.....Atlanta, Ga.
YOUNG, HERBERT A.....(Care Edward H. Whorf), San Luis Potosi, Mexico.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—November, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

NOVEMBER 7TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates declared elected. As Members: Jacob Neff Barr, Milwaukee, Wis.; Carrol Phillips Bassett, Newark, N. J.; William Cain, Charleston, S. C.; William Crawford, Sault Ste. Marie, Canada; George Blinn Francis (elected Junior September 5th, 1883), Providence, R. I.; Henry Newton Francis (elected Junior March 1st, 1876), Providence, R. I.; James Walter Grimshaw, Sydney, Australia; George Richardson Hardy, New Haven, Conn.; Franklin Riffle, Wallula, Washington Territory; Benjamin Burgh Smith, Charleston, S. C.; Frank Sherman Washburn, Chicago, Ill.

The Secretary announced the transfer to Honorary Membership of the following Past Presidents: Julius W. Adams, William Jarvis McAlpine and George Sears Greene.

The Committee appointed at the last Convention to consider a resolution offered by the Special Committee on Uniform Standard Time, and report to a subsequent meeting, made the following report:

November 3, 1888.

To the American Society of Civil Engineers:

At the meeting at Milwaukee, June 29th, 1888, there was proposed and committed to Fred. Brooks and Percival Roberts, Jr., for report at a subsequent meeting, the following resolution:

"*Resolved*, That in accordance with the recommendation contained in the Report of the Committee on Standard Time, the Treatise on Time and Its Notation be brought to the notice of the Bureau of Education,

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with the request that it be widely disseminated for the use of the schools of the United States, and that the Superintendents of Education be invited to enjoin teachers to give special lectures and lessons on the subject to the pupils attending the schools, and that such other means be taken as may be deemed best to attain the object aimed at by the report of the Committee."

Messrs. Brooks and Roberts, Committee, think it beyond the province of the Society to urge the dissemination of one specified treatise for the use of schools, or the enjoining of a particular method of common school instruction, as by "special lectures and lessons;" and have to recommend that the resolution proposed, as above stated, be not adopted.

Respectfully submitted by

FRED. BROOKS,
For the Special Committee.

This report was, on motion, accepted and its recommendation adopted.

The report of the Committee on the Proper Relation to each other of the Sections of Railway Wheels and Rails was discussed.

A paper on "Time Reform," by Fred. Brooks, M. Am. Soc. C. E., was read by the Secretary.

Mr. E. A. Giesler explained a method of determining angles of railroad turnouts.

NOVEMBER 21ST, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

A paper on "The Construction of the Bridge over the Arkansas River, at Van Buren, Ark.," by C. D. Purdon, M. Am. Soc. C. E., was read by the Secretary, and discussed by Messrs. Charles Macdonald, Sooysmith, Collingwood, H. W. Brinckerhoff, Flagg, John Bogart, T. C. Clarke, Croes, and J. P. Davis.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BABB, JACOB NEFF.....	Superintendent of Motive Power, Chicago, Milwaukee and St. Paul Ry., Milwaukee, Wis.....	Nov. 7, 1888

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BASSETT, CARROL PHILLIPS.....Cor. Broad and Market sts., Newark, N. J..... Nov. 7, 1888
CAIN, WILLIAM.....Citadel, Charleston, S. C..... Nov. 7, 1888
CRAWFORD, WILLIAM.....Sault Ste. Marie, Ontario, Canada..... Nov. 7, 1888
FRANCIS, GEORGE BLINN.....(Elected Junior, September 5, 1883), Assistant Engineer New York, Providence and Boston R. R., Providence, R. I..... Nov. 7, 1888
FRANCIS, HENRY NEWTON.....(Elected Junior, March 1, 1876), Assistant Engineer, City Engineer's office, Providence, R. I..... Nov. 7, 1888
GRIMSHAW, JAMES WALTER.....109 Lansdowne road, Kensington Park, London, England. Nov. 7, 1888
LUNDIE, JOHN.....Assistant City Engineer, City Hall, Chicago, Ill..... July 4, 1888
MORRIS, GOUVERNEUR.....Getty House, Yonkers, N. Y... Oct. 3, 1888
RIFFLE, FRANKLIN.....Engineer Oregon and Washington Territory Ry., Wallula, Wash..... Nov. 7, 1888
RUSSELL, NATHANIEL EDWARDS..Trenton, N. J..... Oct. 3, 1888
SMITH, BENJAMIN BURGH.....5 Southern Wharf, Charleston, S. C..... Nov. 7, 1888
WASHBURN, FRANK SHERMAN....Union Stock Yards, Chicago, Ill..... Nov. 7, 1888

JUNIOR.

THOMSON, THOMAS KENNARD....Bridge Department, Pencoyd Iron Works, Pencoyd, Pa.... Oct. 3, 1888

CHANGES AND CORRECTIONS.

ANDREWS, JOHN W.....Chief Engineer Columbus, Ft. Wayne and Western Ry., Covington, Ky.
BARNARD, AUGUSTUS P.....D. K. E. Club, 435 Fifth ave., New York City.
BRENDLINGER, P. F.....79 Warburton ave., Yonkers, N. Y.
BROWN, THOMAS E., JR.....(Care Otis Bros. & Co.), 38 Park row, New York City.
CHURCH, BENJAMIN S.....Consulting Engineer New Croton Aqueduct, Room 213, Stewart Building, New York City.
DAGRON, JAMES G.....415 Broadway, Room 30, New York City.
EVANS, LOUIS P.....(Cofrode & Evans, Engineers and Contractors) Pottstown, Pa.

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FLAD, EDWARD.....Assistant Engineer Board of Water Supply Commission, 312 Central ave., Cincinnati, Ohio.
FTELEY, ALPHONSE.....Chief Engineer New Croton Aqueduct, Room 215, Stewart Building, New York City.
GRANT, WILLIAM H.....3107 N. st., Georgetown, D. C.
HARLOWE, CHARLES.....1417 Sixth st., S. E., Minneapolis, Minn.
HAVEN, WILLIAM A.....Chief Engineer Northern Pacific and Montana Ry., Helena, Montana.
MACY, ARTHUR.....433 Lexington ave., New York City.
MAGUIRE, EDWARD.....Captain Corps of Engineers, U. S. A., Fourth floor, Room 20, P. O. Building, Philadelphia, Pa.
MOORE, ROBERT.....Consulting Engineer, Bridge Entrance, St. Louis, Mo.
SAFFORD, EDWARD S.....Arlington, Mass.
SANDERSON, J. GARDNER.....Kingston, N. Y.
STEVENS, JOHN F.....3217 Lindley ave., Minneapolis, Minn.

ASSOCIATES.

DU BARRY, EDMUND L.....Superintendent Eastern Division Norfolk and Western R. R., Crewe, Nottoway Co., Va.
NICOL, THOMAS W.....U. S. Engineer office, Mobile, Ala.

JUNIORS.

MODJESKI, RALPH.....(Care Morison & Corthell), 35 Wall st., New York City.
STEWART, HUNTER.....Deputy City Surveyor, 25 Carondelet st., New Orleans, La.
TAPPAN, ROGER.....158 West Twenty-second st., New York City.

DEATH.

PHINNEY, HENRY W. B.....Elected Member January 7, 1885; died November 22, 1888.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—December, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

DECEMBER 5TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

Ballots were canvassed, and the following candidates declared elected. As Members: Alfred Craven, Dobbs Ferry, N. Y.; George Wiley Freeman, Fort Stevens, Ore.; William Edward McClintock, Chelsea, Mass.; Norman James Nichols, Honda, Republic of Colombia; Henry Whitbeck Potter, Mexico, Mex.; Edward Herbert Stone, Simla, India; Samuel C. Weiskopf (elected Junior May 7th, 1884), Pittsburgh, Pa. As Associate: John Cresson Trautwine, Jr., Philadelphia, Pa. As Juniors: Thomas Warren Allen, New York City; Mark Fargusson, Brooklyn, N. Y.; John Moyer Farley, Albany, N. Y.; Charles Francis Wood, New Haven, Conn.

A letter from the Council of the Institution of Civil Engineers, making inquiry as to a probable visit of members of the American Society of Civil Engineers to Europe during the coming year, was read, and, on motion, referred to the Board of Direction.

The Secretary announced the death of Samuel Barrett Cushing, M. Am. Soc. C. E., on December 3d, 1888, and of Henry W. B. Phinney, M. Am. Soc. C. E., on November 22d, 1888.

A paper by Edward Bates Dorsey, M. Am. Soc. C. E., on "English and American Railroads Compared in Operating Expenses," was read by the Secretary and discussed by Messrs. T. C. Clarke, J. P. Davis, J. J. R. Croes, Voorhees, Brendlinger, North, Cooper.

DECEMBER 19TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

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A letter from the Society of Arts of London, in reference to proposed European trip, was read by the Secretary.

The Secretary read the results of some experiments on the action of the Teredo on woods preserved in different ways. The subject was discussed by Messrs. Collingwood, Flagg, Cooper, Gosling, Croes, Bogart, and Buck.

John Bogart, M. Am. Soc. C. E., gave a description of Lift Bridges on the canals of the State of New York, and the subject was discussed by Messrs. Flagg, J. P. Davis, Cooper, Croes, Collingwood, Gosling, H. W. Brinckerhoff, Rumble, Buck, and Just.

OF THE BOARD OF DIRECTION.

NOVEMBER 8TH, 1888.—Applications were considered. Financial business transacted.

A communication from Mr. J. E. Watkins, Curator United States National Museum, as to depositing a badge of the American Society of Civil Engineers in the Numismatic Collection of the Museum, was considered.

DECEMBER 6TH, 1888.—Applications were considered. Appropriations made.

A communication from the Council of the Institution of Civil Engineers, in reference to proposed visit to Europe, was considered.

The question of enlargement of the present Society House or the securing of other quarters was considered, and it was resolved to hold a special meeting of the Board on this subject on December 17th, 1888.

DECEMBER 17TH, 1888.—Applications were considered.

A letter from the Society of Arts of London, in reference to proposed visit to Europe, was read. The subject of Society Quarters was considered and committees were appointed to report.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.	Date of Election.
CRAVEN, ALFRED.....Division Engineer New Croton Aqueduct, Dobbs Ferry, N. Y.....	Dec. 5, 1888

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POTTER, HENRY WHITBECK.....Calle San Juan de Letran 4, Apartado de Correo 198, Mexico, Mexico ..... Dec. 5, 1888

JUNIORS.

FARGUSSON, MARK.....257 Jefferson ave., Brooklyn, N. Y..... Dec. 5, 1888
FARLEY, JOHN MOYER .....Fort Plain, N. Y..... Dec. 5, 1888

CHANGES AND CORRECTIONS.

APPLETON, THOMAS.....Secretary Elastic Nut Co., Milwaukee, Wis.
BALDWIN, FRED. H.....101 Commercial st., Greenpoint, N. Y.
BLACK, WILLIAM M.....Captain Corps Engineers U. S. A., P. O. Drawer R, St. Augustine, Fla.
BRODHEAD, CALVIN E.....(Care Lehigh Coal and Iron Co.), 185 East Fourth st., St. Paul, Minn.
CHANUTE, OCTAVE.....Consulting Engineer, 5 Ritchie Place, Chicago, Ill.
COLTON, OREN B.....2009 Wallace st., Philadelphia, Pa.
CONSTABLE, CASIMIR.....41 West Thirty-seventh st., New York City.
CORNELL, GEORGE B.....45 Broadway, New York City.
CRAIG, CHAMBUS M.....Buena Vista, Ga.
GIELOW, HENRY J.....239 Broadway, Room 18, New York City.
LAFON, THOMAS.....(Care Dr. A. W. McAlester), Columbia, Boone Co., Tenn.
LUDLOW, WILLIAM.....Major of Engineers, Bvt. Lt.-Col. U. S. A., Detroit, Mich.
MACLAY, WILLIAM W.....Department of Docks office, foot of Chambers st., North River, New York City.
MORSE, CHARLES J.....2067 Ogden st., Denver, Col.
PARET, MILNOR P.....U. S. Resident Engineer, Fernandina, Fla.
PRENDERGAST, FRANCIS E.....Newton Highlands, Mass.
PRICE, PHILIP M.....Captain Corps of Engineers U. S. A., Montgomery, Ala.
PRINDLE, FRANKLIN C.....Chief Engineer and Superintendent Carolina Oil and Creosote Co., P. O. Box 551, Wilmington, N. C.
ROCKWELL, SAMUEL.....Chief Engineer Eastern Ry., St. Paul, Minn.
SAMPLE, JOHN H.....Chief Engineer Louisville, St. Louis and Texas Ry., 251 Fourth st., Louisville, Ky.
VAN SANT, ROBERT L.....Chief Engineer Indianapolis, Decatur and Western Ry., Indianapolis, Ind.
WILDER, FRANCIS M.....35 Wall st., New York City.

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JUNIORS.

BAIER, JULIUS.....2606 N. Market st., St. Louis, Mo.
CARROLL, EUGENE.....The Light, Heat and Water Co., Jackson, Mich.
KASTL, ALEXANDER E.....793 Michigan ave., Detroit, Mich.
LANT, FRANK P.....Copake Iron Works, New York.
SIKES, GEORGE R.....539 Plymouth ave., Buffalo, N. Y.
TENNEY, GEORGE O.....Box 2, New Decatur, Ala.

RESIGNATIONS.

CASSATT, ALEXANDER J..... December 31, 1888
PHILBRICK, PHILETUS H..... December 31, 1888
POLK, GEORGE W..... December 31, 1888
ROBERTS, POULTER B..... December 31, 1888
SEARS, CLINTON B..... December 31, 1888
SWIFT, MCREE..... December 31, 1888

DEATHS.

CUSHING, SAMUEL B.....Elected Member June 1, 1887; died December 3, 1888.
STEWART, DAVID A.....Elected Fellow November 7, 1872; died December 14, 1888.

ADDITIONS TO

LIBRARY AND MUSEUM.

From American Institute of Mining Engineers. Dr. R. W. Raymond, Secretary, New York City:

Coal Production in Utah, 1886. Charles A. Ashburner.
The Construction of Maps in Relief. John H. Harden.
Matting Dry Auriferous Silver Ores. W. L. Austin.
La Plata Del Libano Mines, Department of Tolima, Republic of Colombia, South America. Willard Ide Pierce.
A Method for the Estimation of Maganese in Steel. Frank Julian.
Discussion of Cheever on Two Conditions of Phosphorous in Iron. H. M. Howe.
Photographing the Interior of a Lead Mine. Fred. P. Deucy.
A Glossary of Furnace Terms in English, French and German. Thomas.

From John W. Bacon, Danbury, Conn:

Thirty-fifth Annual Report of the Railroad Commissioners of the State of Connecticut for the year ending September 30th, 1887.

From Robert Bassel, Technical Attache of the Imperial German Legation, Washington, D. C.:

One Set of Maps of the German Waterways.
Drawings and Descriptions of the Construction of Steam Dredges, Mud Boats and Cruising Steamers in Use in Germany and Published by the Department of Public Works.

From Bates & Kimball, Boston, Mass.:

Technology Architectural Review, Vol. I, Nos. I and II.

From Leonard F. Beckwith, New York City:

A Bound Volume of Photographic Views of Portions of the Electrical Subways, showing Construction, etc.
A Copy of the First Report of the Board of Electrical Control; also Second and Third Reports of the Board of Commissioners of Electrical Subways.
American Newspaper Directory. 1876.
American Railroad Manual. 1873.
Patent Office Report, Vol. 3. 1856.
" " Agriculture. 1857.
" " Vol. 2. 1861.
" " " 1. 1863.
" " " 2. 1863.
" " " 1. 1864.
" " " 2. 1864.
" " " 1. 1865.

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Patent Office Report, Vol. 2. 1865.
" " " 3. 1865.
" " " 1. 1866.
" " " 2. 1866.
" " " 3. 1866.
" " " 1. 1870.
" " " 1. 1871.
" " " 2. 1871.
Official Gazette of the Patent Office, Vols. 1 and 2. 1872.
List of Patents, January to June. 1869.
" " July to December. 1869.
Index. 1870.
List of Patents, January to June. 1870.
" " July to December. 1870.
" " July to December. 1871.

From Henry P. Bell, Victoria, British Columbia:
Report on an Exploratory Survey for a Line of Railway to Connect the Canadian Pacific Railway with Barkerville, Cariboo District.

From General S. V. Benet, Chief of Ordnance, Washington, D. C.:
Theoretical Investigations Relating to Interior Ballistics. Lieut. D. A. Howard.
The Ordnance Department 52-inch Calipers. Lieut. H. E. Bonep.

From H. Bissell, Salem, Mass.:
Twenty-sixth Annual Report of the Maine Central Railroad Company for the year ending September 30th, 1887.

From R. L. Blakman, Danville, Ky.:
Observations on the Zodiacal Light from April 2d, 1853, to April 22d, 1855, Vol. III. George Jones, Washington. 1856.

From the Board of Electrical Control, New York City:
First Report of the Board of Electrical Control for the City of New York, January 6th, 1888.

From Eugene Bolan, Paris, France:
Progidis Rillieux, Part 1 and Part 2.

From Prof. N. Bodington, Leeds, England:
Yorkshire College Calendar for the Fourteenth Session. 1887-88.

From John Bogart, New York City:
First Annual Report of the Managers of the St. Laurence State Asylum for the Insane for the year 1887.
Report of the Commission on New Asylum for Insane Criminals for the year ending December 31st, 1887.

From C. R. Boyd, Wytheville, Virgina:
Boyd's Map of Southwest Virginia.

From Bureau of Education, Washington, D. C.:
Report of the Commissioners of Education for the years 1885-86.
The Study of History in American Colleges and Universities. Herbert B. Adams, Washington. 1887.

From Bureau of Navigation, Navy Department, Washington, D. C.:
Pilot Chart of the North Atlantic Ocean for January, February, March and April, 1888.

From Bureau of Statistics, Washington, D. C.:
Annual Report and Statements of the Chief of the Bureau of Statistics on the Commerce and Navigation of the United States for the Fiscal Year ending June 30th, 1887.
Reports from the Consuls of the United States, Nos. 86, 87, 88 and 89; November, December, 1887; January and February, 1888.

From Buffalo Merchants' Exchange, William Thurstone, Secretary, Buffalo, N. Y.:
Annual Report of the Buffalo Merchants' Exchange, including Statistics of the Trade and Commerce of Buffalo for the year 1887.

From California Academy of Science, Samuel B. Christy, Secretary, San Francisco, Cal.:
Proceedings, Vol. V, Parts 1 and 2, 1873; Part 3, 1874; Vol. VI, 1875; Vol. II, Part 1, 1876, also Index. Bulletin, No. 1, February, 1884; Bulletin, No. 2, January, 1885; Bulletin, No. 3, February, 1885; Bulletin, Vol. II, November, 1887. Memoirs, Vol. II, No. 1.

From Gen. Thomas Lincoln Casey, Chief of Engineers, Washington, D. C.:
Advertisements, Specifications and Proposals, as follows:
For Improving Ship Channel in Galveston Bay, Texas.
For Improvement of Wappoo Cut, South Carolina.
For Improving Vicksburg Harbor, Miss.
For Stone for Lock.
For Improving Pocomoke River, Maryland.
For Removing Wreck at Cornfield Shoal, Long Island Sound.
For Improvement of Raritan River, New Jersey.
For Snagboat for Columbia and Williamette Rivers.
For Furnishing a Steam-Launch during the year 1888 for Service at Sandy Bay, Mass.
For Improving Harlem River, New York.
For Removal of Wreck in Delaware Bay.
For Improving Harbor at Oswego, New York.
For Materials for Improvement of Potomac River, D. C.
For Improving Sheepshead Bay, New York.
For Extending the Breakwater at New Haven, Conn.
For Removal of the Wreck of the Schooner "Dorcas and Eliza," in Pasquotauk River, North Carolina.
For Stone for Lock at Beatyville, Kentucky.
For Removal of Wrecks in Mataponi River, Virginia.
For Removal of Wreck from the Delaware River at Philadelphia, Pa.
For Removal of Wreck of the Steamer "Alice Clark."
For Removal of Wreck in Delaware Breakwater Harbor.
For Dredging Harbor at Cheboygan, Mich.
For Repair of U. S. Engineer Steamer "Tourist."
For Removal of Wreck in Chehaw River, South Carolina.
For Improvement of the Cape Fear River, North Carolina, at and below Wilmington.
For Building a Pile Dike at Canarsie Bay, New York.
For Drilling and Blasting at Saint Mary's Falls Canal, Michigan.
For Furnishing White Oak Timber for Lock Gates at Saint Mary's Falls Canal, Mich.
For Construction of Lock-Tender's House.

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Annual Report upon the Improvement of certain Rivers and Harbors in Maryland, Virginia and North Carolina.
Reports of the Examination and Survey of Tillamook Bay and Bar, Oregon.
Reports of the Examination and Survey of Salt River, Kentucky.
Report of Survey of the Entrance and Outer Bar at San Diego, California.
Report in Relation to the Estimate for Surveys and Reconnaissances in Military Divisions and Departments.
Report upon the Probabilities of Damage to Improvements and the Necessity for Immediate Work on the Flats above the Long Bridge, in front of Washington, D. C.
Reports of the Examination and Survey of parts of Patuxent River, Maryland.
Report in Regard to the Commerce passing the Saint Mary's Falls Canal.
Reports of the Examinations and Surveys of the Mississippi River between Saint Paul and the Saint Anthony's Falls, and of the Red River of the North, from Moorhead to Fergus Falls.
Report on a Bridge Across the Missouri River.
Report of the Examination and Survey of Bayoduce River, Maine.
Reports Respecting the Purchase of a Dredge for Use in Improvement of Harbors in California.
Reports of Examination and Survey of Rockport and Camden Harbors, Maine.
Reports of the Examinations and Surveys of Kennebec and Penobscot Rivers, Maine.
Reports from the Chief of Engineers in Relation to the Proposed Revetting of Williamette River, Oregon.
Reports of the Examinations and Surveys of Jekyle Creek, Georgia, and part of Mosquito Creek, South Carolina.
Report of the Examination and Survey of Gauley and Meadow Rivers, West Virginia.
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— February 6th, 1889, Ballots canvassed; Deaths of HENRY D. BLUNDEN, NATHANIEL W. ELLIS, SAMUEL M. FELTON and LOUIS LESAGE announced; Table showing cost of horse-power on Street Railways in New York and Brooklyn, by G. LEVERICH, presented; The Improvement of Channels in Sedimentary Rivers, by GEORGE H. HENSHAW, read, 38.

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— March 6, 1889, Ballots canvassed; Deaths of WILLIAM S. BARBOUR, EDWARD BAUMANN and EDWARD S. PHILBRICK announced; Award of Norman Medal announced; "English Railroad Track," discussed, 40.
— March 20, 1889, Arrangements for European Trip announced; Progress of construction of Forth Bridge shown by Stereopticon, 40.
— April 3, 1889, Ballots canvassed; Death of EDWARD P. ALLIS and JOHN ERICSSON announced; "Relation between the Rainfall and the Discharge of Sewers in Populous Districts," by EMIL KUICHLING, read.
— April 17, 1889, "The Improvement of the Mississippi River," by WILLIAM STARLING, read; Drawings and Plans of Engineering Constructions exhibited by Mr. HERMAN SCHUSSLER.
— May 1, 1889, Ballots canvassed; Death of CHARLES C. SMITH announced; Minutes in Relation to the Celebration of the Centennial of the Inauguration of George Washington, read; "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," by GEORGE W. RAFTER, read.
— May 15, 1889, Death of Major A. B. ROGERS announced; "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," by GEORGE W. RAFTER, discussed, 59.
— June 5, 1889, Ballots canvassed; Deaths of General ADNA ANDERSON and CHARLES A. MARSHALL announced; Some Account of Johnstown Disaster by WILLIAM P. SHINN; Committee appointed to visit scene of disaster, 62.
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—July 3, 1889, Ballots canvassed.
—September 4, 1889, Ballots canvassed; deaths of HENRY A. BENTLEY, WILLIAM M. LYON and WILLIAM SHAW announced; Committee on Revision of the Constitution announced; "The Sibley Bridge," by O. CHANUTE, JOHN F. WALLACE and WM. H. BREITHAUPT, read; account of progress of work on the Nicaragua Canal, by Mr. H. C. MILLER, 131.
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—October 2, 1889, Ballots canvassed; "Experiments Relating to Hydraulics of Fire Streams," by JOHN R. FREEMAN, read, 144.
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—November 6, 1889, Ballots canvassed; communication from the Institution of Civil Engineers presented, and Committee appointed to prepare reply; communication with reference to proposed visit of British Iron and Steel Institution presented; progress report of Committee on Revison of Constitution presented; "Observations on the Forth Bridge," by CHAS. E. EMERY, read, 157.
—November 20, 1889, "Investigations Relative to Flow of Water in Pipes," by EDMUND B. WESTON, read, 160.
—December 4, 1889, Ballots canvassed; communication as to acceptance of address by Her Majesty Queen Victoria read; ap-

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The Annual Meeting, January 16th, 1889.

The meeting was called to order by President Thomas C. Keefer, who requested the Past Presidents present to take seats upon the platform. (Past Presidents McAlpine, Adams, Greene, Fink, Whittemore, Graff, Flad and Worthen were present during the meeting.)

On the nomination of members present, Messrs. Thomas Rodd, Frank C. Doran, Palmer C. Ricketts and Henry Manley were appointed Tellers to canvass the ballots for officers of the Society. On motion the polls were ordered to be closed at half-past eleven. The tellers were, on motion, authorized to proceed immediately with the preliminary work necessary before opening the ballots, but it was directed that no ballots be opened till half-past eleven.

The Annual Report of the Board of Direction was read by the Secretary, and on motion the report was accepted.

The Report of the Treasurer was read, and on motion accepted.

The hour of half-past eleven having arrived, the President declared the polls closed.

Mr. William G. Hamilton, M. Am. Soc. C.E., of committee in charge of subscriptions for proposed enlarged new building, stated that two of the members of that committee had been absent in Europe during last year; that the subscriptions to the fund amounted to $9 219.50, and that as some time might elapse before the large sum requisite for a suitable new building would be secured, the Board of Direction had determined to build immediately an extension in the rear of the present house. This extension would be of one story and basement, would provide much better accommodation for the library and for the meetings, and would add to the selling value of the present property when the new bulding should be erected. The efforts to secure a sum sufficient for a proper permanent building would be continued.

On motion the report was accepted and the committee continued.

The President.—The Secretary will now present a statement in regard to a proposed visit of members of the Society to Europe.

The Secretary.—I am instructed by the Board of Direction to state that the suggestion of a visit by members of the Society to Europe during the year 1889 had been informally considered, and that during the fall several letters had been received in regard to such a visit from gentlemen abroad. At the meeting of the Society, held December 5th, 1888, a formal letter was presented from the Institution of Civil Engigeers at London. This letter was at that meeting referred to the Board of Direction with the request that all members of the Society be made acquainted with it, and with the action taken by other organizations. The Board thereupon issued the following circular:

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AMERICAN SOCIETY OF CIVIL ENGINEERS,
127 East Twenty-Third Street, New York.

CIRCULAR OF INQUIRY AS TO A SUGGESTED VISIT TO EUROPE.

The Board of Direction informs the members of the Society that the following communication has just been received from the Institution of Civil Engineers.

THE INSTITUTION OF CIVIL ENGINEERS,
25 Great George Street, Westminster, S. W.
November 23d, 1888.

To the Secretary of
THE AMERICAN SOCIETY OF CIVIL ENGINEERS,
127 East Twenty-Third Street, N. Y., U. S.

SIR:

It is reported that many Engineers from the United States will probably visit Europe during the International Exhibition which is to be held in Paris in 1889.

In view of this, the Council of the Institution of Civil Engineers, at the first meeting of the present session, directed an inquiry to be addressed to you to ask: 1st. Whether this report is correct, and, if so, whether your Society can give any idea of the number of your members likely to come. 2d. Whether they will travel by way of England; and 3d. What may be expected to be the approximate date of their arrival and the duration of their stay in this country.

The object of this inquiry is to enable the Council to consider the possibility of making such arrangements as may best tend to further the objects which the visitors have in view, and to render their visit generally as useful and agreeable as possible.

The Council need hardly assure you of its good will towards its professional brethren in the United States, and of its desire to embrace this opportunity of manifesting its friendly feeling to the utmost of its power.

Of course, in any case, the facilities afforded by this Institution are always at the disposal of your members.

We are, yours faithfully,

GEORGE B. BRUCE, *President.*
WILLIAM POLE, *Hon. Secretary.*
JAMES FORREST, *Secretary.*

This circular is now issued so that a proper reply may be made to the above letter.

For the information of members the following additional facts are given: An invitation has been extended to the American Society of

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Mechanical Engineers, by the Institution of Mechanical Engineers of London. We are informed that it is expected that other foreign engineering or scientific societies will also arrange for special courtesies, and that in all these the members of this Society will be included. The American Institute of Mining Engineers and the American Society of Mechanical Engineers are taking steps to ascertain the probable number of their members who would visit Europe next spring in case special arrangements are made.

The following information has been secured by a Committee of the American Society of Mechanical Engineers as to practicable arrangements, and these or substantially similar arrangements can be made for the members of the American Society of Civil Engineers and their families.

DATES.—Minimum absence five weeks. From, say, last week in May to first week in July.

COST.—Round trip passage by steamer about $110, going altogether in a body and returning individually at any time during the year, as may be convenient. Cost per day in Europe from $4 upwards.

To determine: first, what reply to make to the communication of The Institution of Civil Engineers, and second, what arrangement, if any, should be made as to securing passage, rates, etc., a speedy reply to this circular is necessary. A postal card is inclosed for this purpose, which please fill up and return. The replies will be canvassed at the monthly meeting of the Board of Direction, and should therefore be at the Society House by January 2d, 1889.

Respectfully,

JOHN BOGART,
Secretary Am. Soc. C. E.

With the above circular a postal card was sent with alternative replies as follows:

I. It will be impossible for me to visit Europe next spring with other members of the Society.

II. I cannot say at present whether I would visit Europe with other members next spring, but I will know by ————, 1889, and will then inform the Secretary.

III. Should a number of members decide to visit Europe next spring, I fully intend to go with them, and desire to be informed of any arrangements that may be made. My party would consist of myself and ————.

A very large number of replies to the circular have been received; quite a number say they may possibly go. Over one hundred state that

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they fully intend to go, and desire to be informed of any arrangements that may be made.

A communication has since been received from the Society of Arts as follows :

SOCIETY OF ARTS, JOHN STREET, ADELPHI,
LONDON, W. C., 8th December, 1888.

To the Secretary

THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

SIR,—The Council of this Society have been given to understand that a visit of American Engineers to this country during the spring or summer of next year is in contemplation. The Council will be very glad if the Society of Arts can in any way facilitate the visit of your members to England, or render their stay here more pleasant. They will be glad to place the rooms of the Society at their disposal, and if their visit should coincide with the date of the Society's Annual Conversazione in June, they will be very pleased to see as guests on that occasion such of your members as may be able to attend.

We have the honour to be,

Sir, your obedient servants,

ABERCORN,
Chairman of Council.

H. TRUEMAN WOOD,
Secretary.

The Board of Direction presents this information with the suggestion that, as the Society has issued this circular with this result, it may be well to authorize the appointment of a committee to take charge of arrangements for members who desire to go ; not with the idea that this is to be a trip of the Society, but that desirable arrangements as to steamer accommodations, etc., may be secured for this large number of our members.

Mr. WILLIAM P. SHINN moved that the President be authorized to appoint a committee of three with regard to this proposed European trip. The motion was seconded.

Captain O. E. MICHAELIS.—I would like to say a word in regard to these invitations that have been read. The invitations, I think, show that it is not an invitation to the American Society of Civil Engineers as a body ; they are a very pretty and a very courteous inquiry as to the number of members who may visit Europe ; they do not extend an invitation to us. I do not see that the communication requires any action of this Society as a body.

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Mr. A. M. WELLINGTON.—I so far sympathize with the point raised by Mr. Michaelis. Unless the Society intends to go abroad as a body, I do not see why the appointment of a committee should take place; it stamps an official character upon the visit of the Society which hereafter might lead to some embarrassing friction. Unless it is intended that the Society as a body should hold a convention or hold a special meeting abroad, but simply because these members go abroad unofficially, that a committee should be appointed by the President, seems hardly to be the thing.

The PRESIDENT.—I understand Captain Michaelis' remarks in the nature of an amendment to Mr. Shinn's motion.

Captain MICHAELIS.—No, sir.

Mr. WILLIAM P. SHINN.—Mr. President, I think my friend, Captain Michaelis, has struck rather an unfortunate entanglement in this matter. If I understand this case, the officers of the Institution of Civil Engineers have formally issued an invitation to the members of this Society, or at least they have asked the officers of this Society, to acquaint them with the intention of the members of this Society, as such, in regard to going to Europe during the International Exhibition of 1889. The Board of Direction of this Society has issued a circular stating that this opportunity occurs; that they may go over there and be received as members of this Society by the Institution of Civil Engineers, and every provision be made for their comfort and convenience. I see nothing wrong, nothing committing the Society to anything more than the return of the courtesy which is extended to us by the Institution. If we should appoint a committee to attend to this matter for such of the members as choose to go, it does not make it an official visit of the Society, but the members of the Society are invited to signify their intentions as such; they are offered the prospect of certain facilities, as such, and it seems to me there is nothing wrong in this Society's appointing a committee to facilitate this matter.

The PRESIDENT.—Perhaps it would bring out the sense of the meeting if Mr. Shinn's motion is put. I understand Captain Michaelis does not wish his expression of opinion to be understood as an amendment to that motion. As I understand, it is moved and seconded, that the question of the invitation of the Institution of Civil Engineers be referred to a committee of three, to be appointed by the President.

The motion was put and carried.

The PRESIDENT.—The Secretary will now read the statement of suggestions made by members as to a place for the next Annual Convention.

The Secretary read the statement as follows:

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The following suggestions have been made as to place for holding the next Annual Convention:

Boston	suggested by	17
New York	"	12
San Francisco	"	11
Pittsburgh	"	9
Washington	"	9
London	"	9
White Sulphur Springs	"	8
Chicago	"	7
Cincinnati	"	7
Paris	"	6
Philadelphia	"	5
Burlington, Vt.,	"	5
Birmingham, Ala.,	"	5
Kansas City	"	5
Old Point Comfort	"	5
St. Louis	"	5
Saratoga	"	3
Virginia Mountains	"	3
Richmond	"	3
Mexico	"	3
Buffalo	"	3
Omaha	"	2
Newport	"	2
Newport News	"	2
Deer Park	"	2
Lake George	"	2
Helena, Mont.,	"	2
Charleston, S. C.,	"	2

Each of the following places have also been suggested by one member:

Lookout Mountain, Atlantic City, Block Island, Montreal, Chattanooga, St. Paul, Atlanta, Thousand Islands, Providence, Yosemite Valley, Fort William Henry Hotel, Caldwell, N.Y.; Anniston, Louisville, Chautauqua, Moosehead Lake, Toronto, Lake Nicaragua, Roanoke, Detroit, New Orleans, San Diego, Cal.; Nashville, Sault Ste. Marie, Narragansett Pier, The Saguenay, Troy, Wilmington, Del.; Isle of Shoals, on an ocean steamer.

The following suggestion has been received from a number of Michigan members of the Society:

It has been suggested that the Michigan members of the American Society of Civil Engineers propose to that Society for their Annual Convention of 1889, that a boat be chartered to start from Buffalo,

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taking members at Buffalo, Cleveland and Detroit, and visiting Mackinaw, Sault Ste. Marie Ship Canal and Bridge, the pictured rocks of Lake Superior, Marquette, Duluth, and the iron, copper and silver mines of northern Michigan, as they may arrange, holding their meetings on board the boat, this being one of the finest trips in summer that can be found—cool, pleasant, and devoid of dust. A very pretty souvenir of views along the route can be gotten up.

The following invitation was also presented :

NORTH ALABAMA IMPROVEMENT COMPANY,
HUNTSVILLE, ALA., January 11th, 1889.

Mr. JOHN BOGART,
Secretary Am. Soc. C. E.
127 East 23d Street, New York.

DEAR SIR,—At the suggestion of Mr. Hunter McDonald, M. Am. Soc. C. E., of Nashville, we write to extend to your Association a cordial invitation to hold your next Annual Convention in this city, and would be pleased to have you take the matter under favorable consideration. We have, doubtless, the most beautiful and lovely city in the South, with a large and elegant hotel in the city, and a magnificent summer resort hotel near the city, on Monte Sano, open from June to October. We can give you, therefore, ample and first-class accommodations.

Yours truly,

S. H. BUCK,
V. P. & G. M., N. A. I. Co.
ED. T. MASTIN,
Mayor, Huntsville.

Mr. FREDERIC C. WEIR presented a letter describing the hotel at Monte Sano, referred to above, as well adapted for a convention of the Society.

Mr. MENDES COHEN.—There seems to be no very decided information as to any particular point for holding the Convention next year. It occurs to me, if so large a number of our members think of going abroad as has been mentioned—about a hundred announce that they will go, and fifty others think they may—if so large a number are going abroad this year, there will be but a very small attendance at the Convention unless that Convention be held in the immediate vicinity of New York City, and immediately before, perhaps, the departure of the party who are going to Europe. I would therefore suggest that the best thing would be to hold the Annual Convention at some point along the Atlantic coast, say from Long Branch along down to Sea Girt, or some one of the points along the coast where there are comfortable hotels which would be sufficiently large to accommodate all who would attend the Convention. There is a point where the Pennsylvania Railroad,

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coming down from Philadelphia, first strikes the coast—Spring Lake, I think—where there is a very large and fine hotel, and it may be as good as any other point. I merely throw that out as a suggestion to get the views of the members.

The PRESIDENT.—Has any other member any suggestion.

Captain MICHAELIS.—The vicissitudes of the service make me, from time to time, a resident of different portions of the country. Just at the present time I am an advocate of those who reside in our easternmost limits, and I want to take your time for a few moments to present to you the attractions that the State of Maine affords for a convention.

In the first place, we have not a single object of engineering interest to show you; secondly, we can supply you with an abundance of the clearest, purest, best water in the world; thirdly, at Mt. Desert we can offer you cerulean skies, pellucid waters and balmy air that will recall Italy and Como. The hotel accommodation is abundant, and if the time of the Convention be fixed for the latter part of June or early in July, all those hotels are vacant and very moderate terms can be made. The railroads in the State of Maine are one corporation, and I can say it is a very liberal corporation; I think they are always inclined to make very low rates for every convention that is held in that State. One rate, I believe, covers going and returning. I think it would be very easy to arrange an excursion including Moosehead Lake, Mt. Desert and the White Mountains. I believe the Canadian Pacific is now in position to deliver its passengers in Maine. Perhaps our President knows more about that than I do, and therefore it would afford facilities for our Canadian members to join us. For the members south of New York, the New York and New England offers every facility. We should be undisturbed there by anything to distract our attention, and the pleasures that such a trip affords, I think I need not dwell upon. We have the most beautiful country walks, which are an attraction to the young members and not unattractive to the older ones, who will revive their youth.

Mr. M. M. TIDD.—I would like to second the remarks of Captain Michaelis. I was one of the seventeen members who voted to hold the convention in Boston, and in doing so I had in view this very thing that Captain Michaelis has suggested. I have not seen anywhere abroad scenery surpassing that to be found in this locality, and I assure you you will receive as cordial a welcome there as in any part of the country.

Mr. HORACE CROSBY.—As a native of the State of Maine, I can endorse fully what the two preceding speakers have said. Although not now a resident of that State, I occasionally visit it and I can assure you a very pleasant welcome. It is true the points of engineering interest are few and far between, but perhaps it would be well to have a little change in that regard for the Conventions.

The PRESIDENT.—In connection with the remarks of Captain Michaelis, I ought to say that there is within reach of an excursion

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from Maine, or Mt. Desert, an interesting work in progress, the first of its kind, the Chignecto Marine Railway. They only commenced operations late in the autumn. The engineers from England sent out by the Company only reached New York in October last, but I have had a letter from the local engineer, Mr. Ketcham, in which he stated that there are four hundred men at work, and a steam excavator at each end. I hope to say by the time of the Convention that the work will have made sufficient progress to make it worthy of a visit.

Captain MICHAELIS.—I forgot one important point in my remarks. Some years ago, when the Mining Engineers held their convention at Halifax, the railroad administration of the Dominion gave a pass to every member who attended, over their lines of road. You all must know that the Interstate Commerce Act does not apply to the Dominion.

The PRESIDENT.—I think I can speak for the railways of Canada, and if any excursions are projected into Canada, the railways will offer every facility in their power.

Mr. J. J. R. CROES.—I think Captain Michaelis stated that there are very few members of the Society in that region of the country. I would like to know whether there are many engineers there.

Captain MICHAELIS.—I never met one.

Mr. CROES.—The argument that I was going to advance, then, would not hold good. It was that these Conventions have very largely proved to be missionary enterprises in regard to gaining members for the Society. Whenever a Convention has been held in a new district, there has been a large accession to the Society from that district; they have found out that the Society is worth something and they have joined to a great extent. If we were anywhere near, and these excursions could be made to the points at which there were engineers, it might be worth while.

Captain MICHAELIS.—There are, I believe, a number of engineers in New Brunswick; and while I would not promise an immediate accession to the Society, such an excursion might prove of future benefit.

Mr. TIDD.—I had in my mind pretty much the whole of New England; I might say, New Hampshire, Maine and New Brunswick; there are many engineers there, and we have some members there; I have no doubt they would do everything in their power to facilitate our trip.

Mr. W. BARCLAY PARSONS.—I think it would be well to stay in the vicinity of New York as suggested, but if we are to go away from New York, it seems to me that it would be desirable to turn our faces towards the South; and in connection with Mr. Croes' remarks, I believe the Society is not strong in the South, where there are a large number of engineers; if we are to go away from New York City it would be well to consider the places in the South.

The PRESIDENT.—Has any gentleman any other place to bring before

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the meeting, or anything to suggest in connection with those already advocated?

Mr. J. P. DAVIS.—I do not think we ought to decide this question at this time. I would move that this matter be referred to a committee of five, to be appointed by the chair, to decide the time and place.

Mr. D. J. WHITTEMORE.—I wish to make an amendment to the motion, and that is that instead of a committee of five, it be referred to the incoming Board of Direction.

Mr. DAVIS.—I accept that amendment.

The PRESIDENT.—It is moved and seconded that the selection of the time and place for the next Convention be referred to the incoming Board of Direction.

This motion was put and carried.

Mr. SANDFORD FLEMING then presented and read the report of the Committee on Uniform Standard Time (printed at a subsequent page of these proceedings).

On motion, the report was accepted, ordered printed and the committee continued.

Mr. FLEMING.—The committee most unfortunately lost by death one of its members some time back, and if the committee is to continue it will be well to have his place filled up. I move that Mr. Frederick Brooks be added to the committee.

This motion was seconded and carried.

Mr. FLEMING.—If the committee is to continue we must do something, and if the Society thinks that we should do it, we, I think, ought to be authorized to go further. I submit, therefore, the following resolution:

That further efforts be made to effect the general adoption of the twenty-four-hour notation by the railways of the country, and with this view, the committee is requested to seek the co-operation of the General Time Convention.

This resolution was seconded and carried.

Mr. D. J. WHITTEMORE.—To keep this matter before the public, I suggest whether we consider the propriety of asking our General Government to regulate its time according to the plan of the committee; whether it is advisable to have a petition of members of the Society that that system be adopted by our General Government.

The PRESIDENT.—Has any gentleman anything to say upon Mr. Whittemore's suggestion; does any one wish to speak on the point with reference to calling the attention of the General Government of the United States to standard time?

Mr. COHEN.—I do not like that proposition at all. If the General Government, or rather Congress, will attend to the matters within their province, we will attend to ours; we will take care of the time questions. The managers of the railways will do that themselves, but to go to Con-

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gress with a thing of this sort only interferes with the general business which they don't attend to there, and no good will be accomplished. We can attend to that in time.

Mr. WHITTEMORE.—I hardly think the Government will pay much attention to it, but I thought that in this way we could keep it before the public and make them think of it; I think it might do good.

Mr. FLEMING.—I may mention that Mr. Toucey, the General Superintendent of the New York Central and Hudson River Railroad, a member of the committee, holds very strong views; he thinks well of the system.

A great many members in different parts of the country suggest that there should be some way in which this question should be brought before the public schools. I don't know the best way; the method I suggested at the last Convention did not meet with much favor. I hope that there may be some other more practical way in which this can be done. I merely throw out a suggestion, that the committee be authorized to take such steps as may seem to them advisable to bring the subject before the public schools of the country.

The PRESIDENT.—Has any gentleman any remarks to make on that proposition?

Mr. COHEN.—Mr. President, before taking a vote upon that, it seems to me that in this project of bringing the matter before the public schools, the issue of the necessary circulars, etc., will be attended with a vast amount of expense; and whilst it may be desirable to keep up the education, yet whether it is so desirable that these results be accomplished so rapidly as to involve the Society in a great deal of expense, I think is doubtful. We have a vast amount of printing and publication now, and it costs a great deal of money; I think our postage bill, for instance, is more than a thousand dollars. If we are going to communicate with the schools, it would involve a great deal of expense, and while I do not desire to limit the action of the committee, yet I simply want to remind the Society that it may mean a matter of very great cost.

Mr. C. SOOYSMITH.—Another consideration occurs to me. From the letters read by Mr. Fleming it seems evident that the railways are marching in the right direction, and I should say from the experience in standard time, whenever they lead, the public will gradually follow. Will it not be better to let the railroads lead in the matter, as we seem to be sure of their support?

Mr. F. COLLINGWOOD.—We have now a report of the committee which shows absolute progress and a successful use of this method on a great length of railroad. Why not let the committee send such of these documents, or such portions of them as are printed, showing the progress of the movement to the people we wish to influence, and let that be the extent of the movement, a movement which could be accom-

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plished without very great cost, because we will have the matter in type.

Mr. F. W. SKINNER.—It might be well to send them to some of the technical schools; that would be a good place to draw the line; they would do more good there probably than in the ordinary educational schools.

Mr. CROES.—I move to substitute the word "technical" for "public."

The motion was seconded.

Mr. J. P. DAVIS.—I would make a suggestion that this be referred to the Board of Direction, with power; they can limit the expense. I do not think the committee should have power to act at the expense of the Society. I merely make that suggestion.

Mr. FLEMING.—I do not think, sir, the committee has caused the Society much expense so far.

The PRESIDENT.—Mr. Croes moves to amend the resolution offered by the committee by striking out the word "public" and inserting the word "technical," so that the resolution would read: "That the committee be authorized to take such steps as may seem to them advisable to bring the subject of Time Reform to the attention of the technical schools of the country."

The PRESIDENT then put the amendment, and it was carried.

Mr. FLEMING.—I was going to suggest adding two or three words to prevent the possibility of the committee incurring any unnecessary expense; that they should act subject to the approval of the Board of Direction. With the consent of the meeting, these words might be put in.

The PRESIDENT.—Mr. Fleming suggests an amendment as follows: That the committee be authorized to take such steps as may be approved by the Board of Direction of the Society to bring the subject of Time Reform to the attention of the technical schools of the country.

Mr. FLEMING.—If the addition of these words be approved by the meeting, perhaps they would also approve of omitting the word "technical." It would, I think, be better, and if the action of the committee is controlled entirely by the Board of Direction, they would see that nothing improper is done by the committee.

Mr. COHEN.—I should think that suggestion might well be accepted. Of course, it was not because we supposed that anything out of the way would be done by the committee; it was rather a matter of principle that was involved than any anticipation that there would be undesirable action by the committee.

The PRESIDENT.—It would be necessary to reconsider the whole question. The amendment has been carried as to technical schools.

A motion to reconsider was made, seconded and carried.

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Mr. FLEMING then presented the proposed resolution as follows:

That the committee be authorized and requested to take such steps as may be approved by the Board of Direction of the Society to bring the subject of Time Reform to the attention of the schools of the country.

This motion was seconded and carried.

The PRESIDENT.—The next business in order is the report of the Committee on the Compression of Cements and the Settlement of Masonry.

Mr. F. COLLINGWOOD, Chairman of Committee.—I suppose all the members have received our last report. The committee have nothing more at present to offer. The committee is composed of members who are exceedingly busy men, and those who have access to testing-machines have not been able to do any work. I have quite recently been offered help from Professor Ira O. Baker, who is not a member of the committee, and hope, if the committee is continued, to be able to give some valuable results. We want some one who can take up the work, and make a series of tests which shall be sufficiently exact and sufficiently well considered to give results which shall be thoroughly comparative. The results so far have not been compared satisfactorily. I am sorry to say that we have at present no work going on. If the committee is continued I will do what I can, and if any member is making any experiments, or has any knowledge of any, under pressures running up to a breaking strength of, say, 4 000 pounds, I would like to be put in communication with him.

The committee was, on motion, continued.

The Board of Censors to award the Norman Medal presented the following report:

The Board of Censors to award the Norman Medal for the year terminating August 1, 1888, report that, in their judgment, the award should be made to Paper No. 388, "English Railroad Track," by E. E. Russell Tratman, Jun. Am. Soc. C. E.

Respectfully submitted,

FRED. GRAFF,
THEODORE COOPER,
E. N. K. TALCOTT,
Board of Censors.

January 16, 1889.

The Committee to award the Rowland Prize made the following report:

The Committee appointed to award the Rowland Prize for the year terminating August 1, 1888, report that, in their judgment, the prize should be awarded to paper No. 371, "The Venturi Water Meter; An Instrument making use of a New Method of Gauging Water, applicable to the cases of very large Tubes, and of a small Value only, of the Liquid to be Gauged," by Clemens Herschel, M. Am. Soc. C. E.

Respectfully submitted,

B. M. HARROD,
F. H. HAMBLETON,
JOHN BOGART,
Committee.

January 16, 1889.

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After announcement of the proposed excursion for the next day, the Society, at 13 o'clock, took a recess till 14.30 o'clock.

Lunch was served in the Society House.

AFTERNOON SESSION.

President THOMAS C. KEEFER in the chair.

The PRESIDENT.—The next business in order is the report of the Committee to Consider the Proper Relation to Each Other of the Sections of Railway Wheels and Rails.

Mr. H. STANLEY GOODWIN, Chairman of Committee.—Mr. President, the committee are not prepared at this time to do anything more than report progress. They are not ready to make a report supplementary to, or in addition to the report presented at the Convention at Milwaukee. They have in their hands a considerable amount of information which they are endeavoring to adjust and collate as fast as their time will permit. They desire simply to report progress at this time, and say, if it shall be the pleasure of the Society to continue the committee, they will have a report to present at the coming Convention. They are in continued receipt of matter which is pertinent to the subject, and the more attention which the committee give it, the more they are convinced of the importance of the subject and the vast field which it covers, as also the difference of opinion which prevails among practical and skillful men who have given attention to the subject.

I would say that Mr. Wellington, the Secretary of the committee, has been most enthusiastic in his labors. I think the printed report will show that a great deal of information has been brought out and this work still continues.

The PRESIDENT.—The question of the report of the committee which has been alluded to is now open for discussion.

Mr. D. J. WHITTEMORE.—Mr. President, I have prepared a paper, extracts from which I propose to read, which relates particularly to this subject.

Mr. Whittemore then read extracts from the paper referred to.

The PRESIDENT.—The subject of the report of the committee and the paper of Mr. Whittemore is now open for discussion. I am informed, however, that the tellers to canvass the ballot for officers are now ready to report. The discussion will therefore be interrupted while the report is presented.

The tellers then presented their report as follows:

The tellers to count the votes for officers at the Annual Meeting, beg to report as follows:

Total number of ballots received are		596
This does not include votes of members whose dues are not paid	16	
Nor votes without signatures	12	
	—	28

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The following is the vote:

For *President:* M. J. Becker, 311; T. C. Clarke, 282; A. M. Wellington, 1; Mendes Cohen, 1.

For *Vice-President*, Alphonse Fteley, 592; E. L. Corthell, 577; J. J. R. Croes, 6; C. B. Comstock, 3; J. M. Wilson, 2; Alfred Noble, 2; Mendes Cohen, 1; L. L. Buck, 1; Charles Hermany, 1; W. E. Merrill, 1; Charles Ackenheil, 1.

For *Secretary and Librarian*, John Bogart, 584; C. B. Brush, 3; A. M. Wellington, 2; Fred. Brooks, 1; T. C. Clarke, 1; E. P. North, 1.

For *Treasurer*, George S. Greene, Jr., 592; F. Collingwood, 2; E. B. Van Winkle, 1; W. H. Wiley, 1.

For *Directors:* Walter Katté, 575; William P. Shinn, 574; E. C. Clarke, 572; Robert E. McMath, 572; C. B. Brush, 570; Joseph P. Davis, 8; H. D. Whitcomb, 3; G. H. Benzenberg, 3; S. Towle, 2; L. L. Buck, 2; William P. Craighill, 1; J. C. Post, 1; P. F. Brendlinger, 1; E. Low, 1; J. M. Wilson, 1; Adna Anderson, 1; C. Breckenridge, 1; Mendes Cohen, 1; M. S. Belknap, 1; A. M. Wellington, 1; T. Cooper, 1; William Metcalf, 1; Robert Moore, 1; C. Hermany, 1; D. McN. Stauffer, 1; E. B. VanWinkle, 1.

Respectfully submitted,

F. C. Doran,
Thomas Rodd,
Palmer C. Ricketts,
Henry Manley,
Tellers.

The President then announced that the following named members had been duly elected officers of the Society for the ensuing year:

President, M. J. Becker.

Vice-Presidents, A. Fteley, E. L. Corthell.

Secretary and Librarian, John Bogart.

Treasurer, George S. Greene, Jr.

Directors, Charles B. Brush, Eliot C. Clarke, Walter Katté, Robert E. McMath, William P. Shinn.

The President-elect was presented by the President to the Society.

The report of the Committee on the Relation of Sections of Railway Wheels and Rails was discussed by Messrs. William P. Shinn. A. M. Wellington, O. E. Michaelis, Jacob M. Clark, Clark Fisher and D. J. Whittemore.

The report of progress of the Committee on the Proper Relation to Each Other of the Sections of Railway Wheels and Rails was, on motion, accepted, and the committee continued.

The Annual Meeting then adjourned.

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On Thursday, January 17th, the members in attendance at the Annual Meeting met at the Society House and proceeded by elevated railway to One Hundred and Twenty-fifth street, and then by cable road to the gate house of the New Croton Aqueduct, and escorted by Mr. A. Fteley, M. Am. Soc. C. E., inspected that structure and also the laying of the large iron water mains connecting the New Aqueduct with the city distributing reservoirs. A number of the party visited the newly-completed Harlem River Bridge (two steel arches each of 510 feet span and seven granite arches of 60 feet span each). The party then proceeded by steamer to the yards of the Department of Docks, where, under escort of George S. Greene, Jr., M. Am. Soc. C. E., the fabrication of concrete blocks of 70 tons weight was examined. The operation of setting these blocks under water, by the great floating derrick of the Department of Docks, was also exhibited. Lunch was then served on the steamer. The Brooklyn terminus of the New York and Brooklyn Suspension Bridge was then visited, and under escort of C. C. Martin, M. Am. Soc. C. E., the new cable driving machinery inspected. The steamboat then landed at the foot of East Fifteenth street, New York, and an inspection was made of the steel water tank and triple section telescopic gas holder of the Consolidated Gas Company. This steel tank is the largest metallic reservoir in the world, and the gas holder is the largest gas receptacle in America. They were designed by Mr. Thomas F. Rowland, M. Am. Soc. C. E.

In the evening a reception for gentlemen was held at the Society House.

The members of the Society, of the various classes, 176 in number, present at the annual meeting, excursion, etc., were: Charles Ackenheil, Julius W. Adams, P. C. Asserson, John W. Bacon, Frederick H. Baldwin, William J. Baldwin, Carrol Ph. Bassett, Leonard F. Beckwith, Arthur Beardsley, M. J. Becker, Henry A. Bentley, John A. Bensel, George H. Benzenberg, George H. Bishop, H. Bissell, John Bogart, Alfred P. Boller, Charles P. Bonnett, William F. Booth, W. A. Brackenridge, P. F. Brendlinger, Josiah A. Briggs, A. G. Brinckerhoff, H. Waller Brinckerhoff, Charles B. Brush, Andrew Bryson, L. L. Buck, William H. Burr, Frank A. Calkins, David S. Carrl, Jacob M. Clark, H. Wadsworth Clarke, Edward B. Codwise, Mendes Cohen, F. Collingwood, Theodore Cooper, Henry S. Craven, J. James R. Croes, Horace Crosby, J. Foster Crowell, Charles Davis, Joseph P. Davis, Alexander Dempster, George Devin, S. L. F. Deyo, Frank C. Doran, Stancliff B. Downes, Thomas Egleston, Charles E. Emery, John W. Ferguson, Albert Fink, Clark Fisher, J. Foster Flagg, Sandford Fleming, John D. Fouquet, A. Fteley, George S. Gatchell, William Gibson, Jr., Henry H. Gladding, H. Stanley Goodwin, E. Sherman Gould, Frederick Graff, Charles H. Graham, Samuel M. Gray, William Gray, David M. Greene, George S. Greene, George S.

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Greene, Jr., Edward B. Guthrie, William G. Hamilton, Charles M. Harris, Robert L. Harris, William J. Haskins, G. F. Haynes, Warren E. Hill, S. Willett Hoag, Jr., E. W. Howe, Rudolph Hering, William M. Hughes, Alfred E. Hunt, Charles W. Hunt, Washington Jones, Walter Katté, Thomas C. Keefer, Cassius W. Kelly, Thomas P. Kinsley, Joseph M. Knap, William B. Knight, Edward J. Landor, E. D. Leavitt, Jr., G. Leverich, Horace Loomis, L. F. Loree, D. Jones Lucas, Charles Macdonald, William W. Maclay, Henry Manley, C. C. Martin, William J. McAlpine, David E. McComb, T. H. McKenzie, Mansfield Merriman, William Metcalf, Henry C. Meyer, O. E. Michaelis, H. I. Miller, Henry G. Morse, Gouverneur Morris, S. Fisher Morris, Charles H. Nash, Charles E. Newham, Edward P. North, L. F. Olney, John F. O'Rourke, Joseph O. Osgood, John E. Ostrander, Frederick N. Owen, James Owen, William H. Paine, William Barclay Parsons, John A. Partridge, Edward F. Playle, Willard S. Pope, Andrew J. Post, George S. Rice, Palmer C. Ricketts, Percival Roberts, Jr., Thomas Rodd, R. P. Rothwell, Charles B. Rowland, Thomas F. Rowland, George M. Rusling, F. M. Rutherfurd, J. Gardner Sanderson, William L. Saunders, A. C. Savage, C. C. Schneider, William H. Searles, Ira A. Shaler, Robert A. Shailer, William P. Shinn, George S. Skilton, Frank W. Skinner, R. I. Sloan, Eugene R. Smith, Joseph S. Smith, Charles Sooysmith, J. F. Sorzano, D. McN. Stauffer, W. A. Sweet, Edward B. Taylor, G. H. Thomson, M. M. Tidd, Calvin Tomkins, Stevenson Towle, E. E. Russell Tratman, L. L. Tribus, Alfred W. Trotter, John G. Van Horne, J. A. L. Waddell, C. C. Waite, J. H. Warder, James R. Wardlaw, R. Willard Ware, A. M. Wellington, Frederick C. Weir, E. B. Weston, Schuyler S. Wheeler, Frank O. Whitney, Thomas D. Whistler, Don J. Whittemore, William H. Wiley, William P. Williams, C. J. H. Woodbury, William E. Worthen, Henry W. York.

OF THE BOARD OF DIRECTION.

JANUARY 3D, 1889.—Applications considered. A Committee was appointed on Annual Meeting details. The committee appointed at the last meeting reported plans for an extension in the rear of the present house. The plans were approved and the erection of the extension ordered. Financial business was transacted.

JANUARY 15TH, 1889.—The Secretary presented draft of Annual Report. The draft was discussed, amended and the report adopted. The Secretary was directed to present at the Annual Meeting a statement as to the action taken in regard to a proposed visit of Members of the Society to Europe.

JANUARY 16TH, 1889.—In accordance with the provisions of the Constitution, the following Standing Committees were appointed. On Finance: Messrs. Brush, Katté and Clarke. On Library: Messrs. Fteley, Shinn and Corthell.

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REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1888.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 18TH, 1889.

The Board of Direction, in compliance with the provisions of the Society law, presents its report for the year ending December 31st, 1888.

MEMBERSHIP.

As shown by the tabular statement, hereinafter given, there has been during the year an addition of 176 to the various grades of Society membership. In this nominal addition of 176 there are included 3 Members transferred to Honorary Membership and 17 Juniors transferred to Membership, therefore the actual new additions to the Society membership during the year 1888 number 156. The actual additions to the Society membership during the previous year, 1887, amounted to 91.

The losses from the Society membership have been 24, being 15 by death and 8 by resignation. The number of persons now connected with the Society is 1 243, being greater by 133 than at the end of the previous year.

The actual net increase during the year and the present total in each class of membership, are:

Honorary Members,	increase during year,	2	Total..... 10
Corresponding Members.....		...	3
Members,	increase during year,	106	" 944
Associates,	" " "	3	" 48
Juniors,	" " "	24	" 144
			1 149
Fellows, not included above, decrease.....		2	" 54
Subscribers to the Building Fund, not included above		...	" 40
Increase during year.....		133	" 1 243

Tables showing the classification of membership at the beginning of the year, and the changes during the year, are given at a subsequent part of this report.

ANNUAL CONVENTION.

The Annual Convention was held at Milwaukee, Wis , June 28th to July 4th, 1888.

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The proceedings have been published in detail in the Proceedings of the Society for July of that year. There were 133 Members in attendance, with many members of their families. The Annual Address of the President was read and there were a number of interesting papers presented and discussed. Excursions were made to points of interest in Milwaukee and vicinity, and also to Appleton, Kaukana, Oconomowoc and Waukesha; and after the close of the Convention, a number of Members visited the mining regions of Wisconsin, Michigan, and the Sault Ste. Marie.

The suggestions made by Members as to a place for the next Convention will be presented at this meeting for your consideration.

Meetings of the Society.

Twenty-two meetings of the Society were held during the year, one of which was the Annual Meeting, held in New York, January 18th and 19th; and another, the Annual Convention, held at Milwaukee, Wis., June 28th to July 4th. All the sessions of the Convention, including the business meeting, being counted as one meeting of the Society.

Nineteen meetings of the Board of Direction have been held during the year.

Collations, provided entirely by subscriptions of the Resident Members, have followed all regular meetings of the Society at New York.

The Society House and Building Fund.

A special committee of Members of the Society has in charge the ascertaining whether an amount can be obtained from among persons connected with engineering interests for the purpose of the erection of a large and suitable edifice for the future occupancy of the Society. In the meanwhile, as it is probable that some time will elapse before such a building can be erected, the Board of Direction has, under the authority specially given it, determined to erect an extension of the present house which will accommodate the meetings of the Society and the Library, temporarily.

The Norman Medal.

The Norman Medal for the year 1887 was awarded to Paper No. 340, "Evaporation," by Desmond FitzGerald, M. Am. Soc. C. E.

The Board of Censors to award this medal for the past year will present its report at the present meeting.

The Rowland Prize.

The Rowland Prize for the year 1887 was awarded to Paper No. 361, "Steel; its Properties, its Uses in Structures and in Heavy Guns," by William Metcalf, M. Am. Soc. C. E.

The committee to award this prize for the past year will present its report at the present meeting.

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Amendments to the Constitution.

A number of amendments to the Constitution were submitted in due form, considered at the last Annual Meeting, and voted upon, the vote being canvassed at the meeting of March 7th, 1888.

Of these an amendment to Article XVIII was adopted, as follows:

"Proposals for admission to the Society of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient, in their opinion, to show that the candidate is worthy of acceptance."

Under this provision of the Constitution, members of the Board of Direction have, in a number of cases, endorsed for ballot certain engineers who were not personally known to a sufficient number of Members of the Society, and in regard to whom evidence was given that they were worthy of membership.

The following amendment to Article XIX of the Constitution was also adopted:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a re-consideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

But one case has been presented to the Board under this provision of the Constitution, the open ballot upon which has been recently issued, to be canvassed at the next meeting of the Society.

The other proposed amendments to the Constitution are given in the Proceedings for January, 1888, and were not adopted.

No amendments have been offered for consideration at this meeting.

Report of the Committee as to Grades and Titles of Engineers on Public Works.

At the last Annual Meeting the appointment of a committee was directed to formulate regulations with reference to grades and titles of engineers on public works. This committee was duly appointed and made its report at the Annual Convention, which report has been printed in the September Proceedings.

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The Report of the Committee to Consider the Proper Relation to Each Other of the Sections of Railway Wheels and Rails.

This committee presented a report of progress at the Annual Meeting. Its preliminary report has since been submitted to the Society in the Transactions for July.

The committee will be called upon at this meeting for any further report they desire to make, and the subject will be one open for discussion

The Report of the Special Committee on Uniform Standard Time.

The committee made reports at the Annual Meeting, and also at the Convention. An additional report will be expected at the present meeting.

The Committee on Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry.

This committee has made reports at the Annual Meeting and also at the Convention, the latter report having been published in the Transactions for June of the past year.

The Transactions of the Society.

The publication of the Transactions has been continued regularly during the year. Communications addressed to the Board in reference to matters connected with the Transactions have been carefully considered, and the Board, in order that full information as to its previous action upon this subject might be given to all interested, issued the following circular:

American Society of Civil Engineers,
127 East Twenty-third Street, New York.

The Board of Direction of the American Society of Civil Engineers invites professional papers and communications on subjects of engineering interest from all persons, whether members of this Society or not. These papers and communications will be accepted for publication in the Transactions of the Society, subject to the regular rules prescribed by the Society laws in regard to its publications. These rules provide for a proper editorial supervision, and for the exclusion of old matter readily found elsewhere, of matter specially intended to advocate personal interests, of matter carelessly prepared or controverting established facts, and of matter purely speculative or foreign to the purposes of the Society.

Discussion is also invited from all persons interested in the papers presented to the Society, such discussion to be, of course, subject to the same editorial rules.

The Transactions of the Society will be sent to any subscriber at the rate of $10 per year; and to clubs of ten or more, when ordered through

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the Secretary of an engineering or technical society or club, who will be responsible for the payment, at 25 per cent. discount.

For the Board of Direction.

JOHN BOGART,
Secretary.

In reference to the copyright upon Transactions, the Board has declined to make any modification of the past system. At present, anybody is permitted to make any proper use of the publications, and there has been no interference with, or objection to the reproduction of matter from the Transactions, provided it be in proper publications, and that due credit be given to the author and to the Transactions. The Board considers that it would be undesirable to eliminate the only means of correcting a misuse, if such should occur.

SUGGESTED VISIT OF MEMBERS OF THE SOCIETY TO EUROPE.

A communication from the Institution of Civil Engineers, London, was received in December last, in reference to a probable visit to Europe of Members of this Society during the International Exhibition to be held in Paris in 1889. This letter has been transmitted by circular to all the Society membership, together with some information as to arrangements that may be made if a suitable number of Members desire to make such a visit. Other engineering organizations are considering similar arrangements. Replies have been received from a large number of Members of this Society, and over one hundred have signified their expectation of making such a trip, if arrangements be perfected for that purpose.

MEMBERSHIP TABLES.

The following tables show the changes and additions during the year in the various classes of Membership.

On January 1st, 1887, the date of the last report, the membership in the Society was:

Honorary Members, resident....	3	Non-resident..	5	Total...	8
Corresponding Members.....	—	" ..	3	" ...	3
Members, resident	168	" ..	670	"	838
Associates, "	11	" ..	34	"	45
Juniors, "	29	" ..	91	"	120
					1 003
Making, resident.....	211	Non-resident..	803		
Total.....					1 014
Fellows, 62, of whom 6 Members are included above, leaving.....					56
Subscribers to the Building Fund, 140, of whom 89 are entered in one or other of the above classes, and 11 deceased, leaving....					40
Total connected with the Society, January 1st, 1888..					1 110

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At the present date, January 1st, 1889, the membership is:

Honorary Members, resident...	7	Non-resident..	3	Total...		10
Corresponding Members	—	" ..	3	" ...		3
Members, resident.....	193	" ..	751	"	944	
Associates, "	12	" ..	36	"	48	
Juniors, "	40	" ..	104	"	144	
	—		—			1136
Making, resident.....	252	Non-resident..	897			
Total.....						1149
Fellows, 59, of whom 5 Members are included above, leaving.....						54
Subscribers to the Building Fund, 140, of whom 87 are entered in one or other of the above classes, and 13 deceased, leaving...						40
Total connected with the Society, January 1st, 1889..						1243

The additions during the past year to the several classes of Society membership have been:

Honorary Members qualified.....	3
Members qualified..	124
Associates qualified.....	5
Juniors qualified	43
Fellow qualified	1
Total additions	176

The decrease during the year in the several classes of membership has been:

Honorary Members..Died	1	.....			1
Members..... "	9	Resigned	6*	.Transferred to H. M.	3. 18
Associates..... ..		"	2	.....	2
Juniors .....Died	1	"	1	.Transf'ed to Member	17. 19
Fellows ..... "	4	.....			4
Totals: Deaths 15, Resignations 9, Transferred 20					44
*1 Resigned membership but continues a Fellow					1
					43

There has been an addition of 176 to the various classes of membership, and a decrease of 43, making the actual net additions during the year 133 in number.

On January 1st, 1888, there were, as stated in the last Annual Report, 56 proposals pending. Two hundred and fourteen proposals have been received during the year; 130 candidates have been elected Members, of whom 17 were transferred from Juniors; 6 candidates have been

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elected as Associates; 44 candidates have been elected as Juniors; 1 candidate has been elected a Fellow; 3 Members were transferred to Honorary Members.

One hundred and twenty-four persons have during the year qualified as Members; 5 have qualified as Associates; 43 have qualified as Juniors; 1 has qualified as Fellow; 11 candidates elected during the year as Members, 1 as Associate and 4 as Juniors, have not yet qualified. There are 26 proposals now pending.

The Library has been increased during the year by the following additions:

Books and Pamphlets	609
Maps, Plans, Drawings, Charts, Photographs and Engravings	375

The Society has lost, by death, during the term covered by this report, one Honorary Member: SQUIRE WHIPPLE; nine Members: WILLIAM L. BAKER, SAMUEL B. CUSHING, CHARLES H. FISHER, QUINCY A. GILLMORE, CHARLES LATIMER, FREDERICK MERCUR, HENRY W. B. PHINNEY, JAMES L. RANDOLPH and HENRY F. WALLING; one Junior: WILLIAM A. G. EMONTS; and four Fellows: GEORGE AINSLIE, GEORGE W. CASS, SPRINGER HARBAUGH and DAVID A. STEWART. Messrs. Ainslie and Harbaugh died previous to this term; these deaths, however, were not announced until the present year.

Respectfully submitted,

JOHN BOGART, *Secretary.*

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REPORT OF THE TREASURER FOR THE YEAR ENDING DECEMBER 31st, 1888.

RECEIPTS.

Balance on hand December 31st, 1887:

Building Fund		$5 134 50	
General Funds		1 371 02	
			$6 505 52
Entrance Fees		$4 240 00	
Current Dues:			
From 142 Resident Members	$3 440 00		
" 636 Non-resident Members	9 247 00		
" 13 Resident Associates	187 50		
" 30 Non-resident Associates	300 00		
" 23 Resident Juniors	307 50		
" 100 Non-resident Juniors	970 00		
	$14 452 00		
Past Dues:			
From 16 Resident Members	$575 00		
" 61 Non-resident Members	1 295 12		
" 3 Resident Associates	45 00		
" 7 Non-resident Associates	130 00		
" 1 Resident Junior	15 00		
" 8 Non-resident Juniors	110 15		
	2 170 27		
Dues for year beginning January 1st, 1889:			
From 32 Resident Members	$800 00		
" 123 Non-resident Members	1 830 19		
" 3 Resident Associates	45 00		
" 6 Non-resident Associates	60 00		
" 6 Resident Juniors	90 00		
" 13 Non-resident Juniors	130 00		
	2 955 19		
		19 577 46	
From sales of Publications		1 072 74	
" Certificates of Membership		193 25	
" Advertisements		433 00	
" Interest on Pennsylvania General Mortgage Bonds	$540 00		
" Savings Bank Deposit	30 44		
" City of New York Croton Aqueduct Stock	70 00		
" Chicago and Northwestern Railroad Bond	50 00		
" West Shore, New York Central Guaranteed Bonds	100 00		
" Consolidated Gas Stock	40 00		
		830 44	
From Fellowship Fees		150 00	
Subscriptions to Fund for Enlarged Building		1 860 00	
Compounding Payments		650 00	
Other sources		50 00	
			29 056 89
			$35 562 41

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DISBURSEMENTS.

Interest on Mortgage	$800 00	
Taxes	483 83	
Publications	10 508 85	
Stationery and Printing	1 233 82	
Postage	1 543 85	
Library	814 05	
Salaries	3 000 00	
Convention and Annual Meeting	1 417 27	
Janitor, House Supplies, Fuel, Water and Gas	1 724 22	
Certificates of Membership	138 45	
Insurance	71 88	
Norman Medal and Rowland Prize	120 50	
Finance—Treasurer's Books, General Accounts, Collections	1 200 00	
Work of Committees	467 00	
Other Expenditures	418 23	
		23 941 95
Purchase of Bonds for Building Fund		5 075 00
Transferred to Savings Bank		30 44
Balance on hand:		
Building Fund	$1 919 50	
General Funds	4 595 52	
		6 515 02
		$35 562 41

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The funds of the Society are as follows:

Fellowship Fund:	
Ninety-two subscriptions to December 31, 1887.....	$9 950 00
Premium and accumulated interest December 31, 1887	1 388 28
Fund on hand December 31, 1887.....	$11 338 28
One subscription during 1888.....	150 00
Interest received during 1888.....	547 00
	$12 035 28
Expended for publications during 1888.....	547 00
	$11 488 28
The present investment of the Fund is:	
Nine Pennsylvania Railroad General Mortgage Six per cent. Bonds, cost.....	$11 111 82
Portion of deposit in Seamen's Bank for Savings.....	376 46
	$11 488 28
Norman Medal Fund:	
One Certificate Croton Aqueduct Stock, New York City.....	$1 000 00
Building Fund:	
Receipts previous to December 31, 1885.....	$17 842 00
Expended:	
For Legal Services, Circulars, etc.....	355 03
For Improvements on Property.....	3 486 97
Payments on Purchase.....	14 000 00
	$17 842 00
Fund for Enlarged Building:	
Receipts.....	$8 029 50
This Fund comprises:	
Cash.....	$1 919 50
One Chicago and Northwestern Railroad Five per cent. Bond, cost.....	1 035 00
Five West Shore (N. Y. C. & H. R. R. Guarantee) Bonds, cost	$5 075 00
	$8 029 50

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Rowland Prize Fund:

One Pennsylvania Railroad General Mortgage Six per cent. Bond, cost	$1 222 50

General Investment:

Ten Shares Stock Consolidated Gas Company of New York, cost	$972 50
Portion of deposit in Seamen's Bank for Savings	211 04
	$1 183 54

Compounding Fund:

Six single payments for compounding dues	$1 650 00

The present investment of this Fund is:

One Pennsylvania Railroad Six per cent. General Mortgage Bond, cost	$1 222 50
Portion of deposit in Seamen's Bank for Savings	427 50
	$1 650 00

Respectfully submitted,

G. S. GREENE, Jr.,
Treasurer.

REPORT OF THE COMMITTEE ON FINANCE.

The Finance Committee have the honor to report that they have performed the duty of auditing all the bills which have been paid by the Treasurer during the past year, and have found that each bill has been charged to its proper fund, and that the several sums paid have not exceeded the amounts appropriated by the Board of Direction for the purposes specifically mentioned.

They have also seen that the investments, transfers and deposits have been made as detailed in the reports of the Secretary and Treasurer.

STEVENSON TOWLE,
Chairman of Committee.

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REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, NEW YORK, JANUARY 16TH, 1889.

The Special Committee on Uniform Standard Time begs leave respectfully to report:

The last annual report of the Committee referred to action which had been taken by the General Time Convention the year previous, with the view of securing an expression of opinion from members of that association on the subject of the twenty-four-hour notation.

Circulars had been sent out by the Secretary of the General Time Convention, directing attention to the contents of a pamphlet issued by the American Society of Civil Engineers, setting forth the experience which up to that date had been gained on the Central and Mountain Divisions of the Canadian Pacific Railway, where the new notation had been in use for some months. A series of questions also accompanied the circular, to which members of the General Time Convention were requested to furnish replies.

The replies were referred to in the last annual report of this Committee, where, among other things, it was stated that (61) sixty-one affirmative and (38) thirty-eight negative replies had been received in reference to the question, "Are you in favor of the general adoption of the twenty-four-o'clock system of counting the hours—abandoning the use of A.M. and P.M.?"

It was deemed important to ascertain the precise character of the thirty-eight negative replies, and accordingly application was made to the Secretary of the General Time Convention, Mr. W. F. Allen, for copies of the objections which had been offered. Through the courtesy of that gentleman, the information has been received since the last Annual Meeting of this Society.

An examination of all the replies containing objections shows the following expressions of opinion, viz.:

6 That the A.M. and P.M. system is good enough.
5 That there is nothing to be gained by a change.
4 That the people should be educated to the new system before the railways adopt it.
3 That the adoption of the change would cause great confusion.
2 That it will be impossible to get men to understand the new notation.
2 That it is advisable to delay adopting the new notation until more experience is gained on the railways now using it.
2 That doubts are entertained if it can be brought about.
2 That its adoption should be delayed until all the railways are prepared to adopt the change simultaneously.

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1 A preference is expressed for the decimal division of the day.
1 That midnight should be designated ZERO or O, in place of twenty-four hours.
1 Has difficulty in offering any serious objections to the new system.
1 Does not think it concerns the public very much.
1 That it is for the Government to authorize the adoption of the new notation rather than the railways.
1 Is of opinion that the change would involve great expense.
1 That there will be some objection to the change whenever it may be made.
1 Is not sufficiently familiar with the working of the new system.

The deductions from this analysis are, that of the ninety-nine railway managers who in April, 1887, furnished replies to the questions placed before them, there were only six who considered the A.M. and P.M. system good enough, and only five who were then unable to recognize the advantages of the new notation. That the objections were not considered very serious by the writers of them, is evident from the fact that in twenty-one of the thirty-eight negative replies, it is stated that they will be prepared to adopt the twenty-four-hour notation if the connecting lines do the same.

The objections which have been raised are met in the most convincing manner by letters from railway men who have now had from two to three years' daily experience in the use of the new notation in operating railways. These communications are placed at the service of the Committee and comprise the following, viz.:

15 Letters from managers, assistant managers, superintendents and assistant superintendents.
7 Letters from train dispatchers.
8 Letters from conductors.
25 Letters from station masters.
18 Letters from track masters and track foremen.
2 Letters from yard masters.

There is a singular unanimity of opinion expressed in all these letters in favor of the new system. At present, your Committee cannot do better than submit the two communications which have been last received, viz.:

First.—A letter from Mr. Collingwood Schreiber, General Manager of the Intercolonial Railway of Canada, dated the 9th instant.

Second.—A letter from Mr. W. C. Van Horne, President of the Canadian Pacific Railway, dated the 10th instant.

CANADIAN GOVERNMENT RAILWAYS.
Office of the Chief Engineer and Ge
OTTAWA, January 9th, 1889.

DEAR SIR,—I have your letter of yesterday's date, making inquiry as to whether or not the twenty-four-hour system of time notation is still

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in use upon the Government Railways, and if so, desiring to be informed if it gives satisfaction.

In reply I may say, the twenty-four-hour time notation was introduced upon the Inter-colonial Railway (906 miles) and the Eastern Extension Railway (80 miles) on June 13th, 1887; that it has been in most successful operation from that date to this. I anticipated at the time some trouble in having such a novelty introduced, imagining the public press and the employés of the road would combat it, but such has not been the case; not a word of complaint, so far as I am aware, has appeared in the newspapers upon the subject, and our officers and employés, as a rule, appear to view it as an advancement in the right direction, those employés immediately connected with the movement of the trains especially favoring the system. Under this time notation system no confusion can arise, and for this reason greater safety is assured.

For my own part I may say I am strongly in favor of the twenty-four-hour system of time notation, and I propose, so soon as the Oxford and New Glasgow Railway (70 miles), and the Cape Breton Railway (100 miles), now under construction, are completed and turned over to the Operating Department, to extend the system to those lines. I think it would be an advantage if it was more generally used by the railways, and I hope, at no distant day, to see its use very much extended; in fact, it appears to me it would be a great advantage if the railway managers throughout the Continent would put the twenty-four-hour system of time notation in operation upon their roads; it certainly could not but be fraught with good results. I may, however, remark that I do not think the public will readily take it up for general use until such time as it is taught in the public schools; if this was done, I believe it would very soon come into use for all purposes.

I am,

Yours very truly,

(Signed) COLLINGWOOD SCHREIBER,
Chief Engineer and General Manager
Government Railways.

SANDFORD FLEMING, Esq.,
Chairman Special Committee on Standard Time,
Am. Soc. C. E.

CANADIAN PACIFIC RAILWAY CO.,
MONTREAL, January 10th, 1889.

MY DEAR MR. FLEMING:

Replying to your note of the 6th instant, I am happy to be able to say that our nearly three years' trial of the twenty-four-hour system on all of our lines west of the Great Lakes, embracing 2 354 miles, has been

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highly satisfactory. No confusion whatever resulted from its adoption or has grown out of its use, and I have yet to hear of the first objection to it on the part of the public.

The Manitoba and North Western Railway Company, 207 miles, and the North Western C. and N. Company's Railway, 110 miles, also follow this system. It is therefore the only system used for railway purposes north of the forty-ninth parallel and west of the eighty-ninth meridian.

We hope soon to be able to extend this system over all the company's lines in the east. We should have done so before this time, if some of our neighboring lines had been in a position to join us in the movement.

A short experience with it must, I believe, convince anybody that it is vastly superior for railway purposes to the old system. It takes a surprisingly short time to come to think of twenty o'clock instead of eight o'clock P. M.

There is no danger in its adoption, even on a very busy line. The term 19.47, for instance, in a train order, cannot be mistaken for anything else.

Yours very truly,

(Signed) W. C. VAN HORNE.

SANDFORD FLEMING, Esq., C. E., C. M. G.,
Ottawa, Ont.

These letters conclusively establish that the new notation has been thoroughly tested for two or three years on 3 657 miles of railway, that no difficulty whatever has been experienced in introducing the change, that it has been readily accepted by the public without a single objection being heard, that its extreme simplicity and the impossibility of errors resulting from its use facilitates the movements of trains and promotes the public safety. The new system having thus proved so satisfactory in every way, it has now been determined to employ it on 3 053 additional contiguous miles, which will make a total length of 6 710 miles of railway shortly to be operated under the new notation.

It is obvious that there can no longer be any doubt as to the practical advantages of the new system, and the ease with which it can be applied to the operating of any line of railway. The thirty-eight negative replies which have been cited cannot be said to present insuperable difficulties, and it is believed that the writers of them will now have their views greatly modified by the experience which has since been gained and the explanations made in the more recent letters which have been submitted.

Your Committee cannot but think that in the public interest it is advisable that renewed efforts be made to secure the general adoption of the new notation.

SANDFORD FLEMING,
Chairman Special Committee.

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LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Election.
FERRY, CHARLES ADDISON	(Elected Junior, May 4th, 1881) First Assistant City Engineer, 18 City Hall, New Haven, Conn	Jan. 2, 1889
GIBBS, CHARLES WINGATE	Chief Engineer Silverton R. R., Silverton, Colo	Jan. 2, 1889
HANDY, EDWARD ADINO	Engineer Lake Shore Division, Lake Shore and Michigan Southern Ry., Cleveland, Ohio	Jan. 2, 1889
HARDY, GEORGE RICHARDSON	1423 Chapel st., New Haven, Conn	Nov. 7, 1888
KEEFER, GEORGE ALEXANDER	Chief Engineer Vancouver Water Works, Victoria, British Columbia	Jan. 2, 1889
NASH, CHARLES HENRY	Bloomfield, N. J	Sept. 5, 1888
PEARL, JAMES WARREN	Civil Engineer and Contractor, Canton, Ohio	Jan. 2, 1889
POWELL, CHARLES FRANCIS	Captain Corps of Engineers U. S. A., 2653 Olive st., St. Louis, Mo	Oct. 3, 1888
QUINTUS, JOHN CHARLES	Erie, Pa	Jan. 2, 1889
RICE, LEWIS FREDERICK	American House, Boston, Mass.	Jan. 2, 1889
SMITH, ISAAC AUSTIN	Chief Engineer St. Louis Transfer Ry., 24 North 3d st., St. Louis, Mo	Oct. 3, 1888
STOREY, WILLIAM BENSON, Jr.	Orting, Pierce Co., Wash	Jan. 2, 1889
WEISKOPF, SAMUEL C	(Elected Junior, May 7th, 1884) P. O. Box 732, Pittsburgh, Pa	Dec. 5, 1888
WENTWORTH, WILLIAM HENRY	Engineer in charge, Monterey and Gulf Mexico R. R., Monterey, Nuevo Leon, Mexico	Jan. 2, 1889

JUNIOR.

WARNER, CHARLES ST. JOHN	132 Broadway, New York City.	Jan. 2, 1889

FELLOW.

HILL, JAMES J	President St. Paul, Minneapolis and Manitoba R. R., St. Paul, Minn	Jan. 10, 1889

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CHANGES AND CORRECTIONS.

BARLOW, JOHN Q .....(Care V. G. Bogue, Chief Engineer Union Pacific Ry.), Omaha, Neb.
BRYSON, ANDREW .....(Shunk & Bryson), 60 Broadway, Room 324, New York City.
DELAFIELD, CLARENCE.....West New Brighton, Richmond Co., N. Y.
DOANE, WALTER A.....Engineer of Bridges, Oregon Pacific R. R., Corvallis, Ore.
DONOVAN JOHN J.....Bellingham, Wash.
FRIZELL, JOSEPH P .....U. S. Engineers' Office, Nashville, Tenn.
FTELEY, ALPHONSE.....Chief Engineer Aqueduct Commission, 213 Stewart Building, New York City.
FULTON, JOHN A .....Oliver House, Toledo, Ohio.
GERBER, EMIL.....Resident Engineer Jacksonville Bridge Co., Jacksonville, Fla.
HEGEMAN, ALLEN B.....Division Engineer Interoceanic Ry., Tepeyahualco, Puebla, Mexico.
HODGES, ARTHUR .....Chief Engineer Johnson Co., Johnstown, Pa.
JOHNSTON, HORACE G .....Salina, Kansas.
MAXIM, HIRAM S.....Crayford, Kent, England.
MCKEE, SAMUEL B .....Moriah Centre, Essex Co., N. Y.
MCLAIN, LOUIS R.....Contractor for Alabama Midland Ry., Bainbridge, Ga.
MILLER, J. IMBRIE.....Box 807, Pueblo, Colo.
MINTURN, ROWLAND R .....Shoreham, Addison Co., Vt.
MORSE, CHARLES J.....821 27th st., Denver, Colo.
MORSE, HENRY G.....President Edge Moore Bridge Works, Edge Moore, Del.
NEWHAM, CHARLES E.....530 West 156th st., New York City.
OLNEY, GEORGE R.....242 West 43d st., New York City.
OPDYKE, STACY B., JR... .....General Superintendent Hartford and Connecticut Western R. R., Hartford, Conn.
PEARY, ROBERT E.....Civil Engineer U. S. N., Office of Nicaragua Canal Co., 36 Wall st., New York City.
PRENDERGAST, FRANCIS E.....Sault Ste. Marie, Mich.
RIFFLE, FRANKLIN.....Chief Engineer Oregon and Washington Territory R. R., Walla Walla, Wash.
ROWE, SAMUEL M.....Chief Engineer Western Division Atlantic and Pacific R. R., Albuquerque, N. M.
SEDGWICK, THOMAS S.....Florence Hotel, San Diego, Cal.
SEYMOUR, CHARLES.....Madisonville, Hopkins Co., Ky.
SHINN, WILLIAM P.....Vice-President New York and New England R. R., 36 Wall st., New York City.
SMITH, JOSEPH S.....56 West 45th st., New York City.
TALCOTT, COOK.....The Hudson Suspension Bridge and New England Ry., 38 Wall st., New York City.

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UNTHANK, ACHILLES W.....Chief Engineer San Joaquin Land and Water Co., Knight's Ferry, Cal.
WATSON, WILLIAM P.....(Care Oregon Railway and Navigation Co.), Portland, Ore.
WIGHTMAN, WILLARD H.....Assistant Engineer Spokane and Palouse Ry., Ashland, Ore.

ASSOCIATE.

STONE, WATERMAN.....General Manager Inter-State Consolidated Rapid Transit Ry., Kansas City, Mo.

JUNIORS.

BENSEL, JOHN A.....Assistant Supervisor Division A, Pennsylvania R. R., Taylor's Hotel, Jersey City, N. J.
GOSLING, EDGAR B.....(Care E. Coignet), 98 rue Demours, Paris, France.
MOULTHROP, GEORGE E.....(Ray and Moulthrop), Civil and Mining Engineers, Butte, Mont.
YOUNG, HERBERT A.....(Care E. R. Comfort), Division Superintendent Mexican Central Ry., El Paso, Texas.

RESIGNATIONS.

CHAPHE, ANDREW J.....December 31, 1888
GORDON, ALEXANDER.....December 31, 1888

DEATHS.

BLUNDEN, HENRY D.....Elected Junior January 5, 1876; elected Member February 4, 1880; died January 7, 1889.
ELLIS, NATHANIEL W.....Elected Member February 2, 1881; died January 16, 1889.
LESAGE, LOUIS.....Elected Member September 7, 1881; died January 9, 1889.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV.—February-March, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

FEBRUARY 6TH, 1889.—The Society met at 20 o'clock, Thomas J. Whitman, M. Am. Soc. C. E., in the Chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: Samuel Lispenard Cooper, Yonkers, N. Y.; Sören Theodor Munch Bull Kielland, Buffalo, N. Y.; Samuel Clarence Thompson, New York City; Frank Herbert Todd, St. Cloud, Minn.; Schuyler Skaats Wheeler (elected Junior March 2d, 1887), New York City. As Associate: James Frederick Lewis, New York City. As Juniors: James Benton French, Philadelphia, Pa.; George King McCormick, Johnson City, Tenn.

On motion, it was resolved that a special ballot for reconsideration of a rejected candidate, announced for canvass at this meeting, be declared informal, and the whole matter be referred to the Board of Direction for consideration.

The death of Henry D. Blunden, M. Am. Soc. C. E., on January 7th, 1889; the death of Nathaniel W. Ellis, M. Am. Soc. C. E., on January 16th, 1889; the death of Samuel M. Felton, F. Am. Soc. C. E., on January 24th, 1889; and the death of Louis Lesage, M. Am. Soc. C. E., on January 9th, 1889, were announced.

The Secretary announced the election to Fellowship, on January 10th, 1889, of Mr. James J. Hill, of St. Paul, Minn.

The Secretary announced the presentation to the Society by W. H. Jennings, M. Am. Soc. C. E., of a Generalized Section of the Coal Measures of Southern Ohio.

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A table showing the cost of horse-power on street railways in New York and Brooklyn, by G. Leverich, M. Am. Soc. C. E., was read by the Secretary.

A paper on "The Improvement of Channels in Sedimentary Rivers," by Mr. George H. Henshaw, was read by the Secretary.

FEBRUARY 20TH, 1889.—By invitation of the American Institute of Mining Engineers, the Society attended the meeting of that Institute at Hardman Hall, at which occurred a discussion on Iron and Steel.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BROWN, ELBRIDGE LEONARD	Room 14, City Block, Brockton, Mass	Sept. 5, 1888
COOPER, SAMUEL LISPENARD	Box 767, Yonkers, N. Y.	Feb. 6, 1889
FITZ GERALD, JOHN LELAND	5 Central Arcade, Schenectady, N. Y.	Jan. 2, 1889
KIELLAND, SÖREN THEODOR MUNCH BULL	Care Lehigh Valley R. R., Buffalo, N. Y.	Feb. 6, 1889
MCCLINTOCK, WILLIAM EDWARD	City Engineer, Chelsea, Mass.	Dec. 5, 1888
NICHOLS, NORMAN JAMES	Honda, Republic of Colombia.	Dec. 5, 1888
THOMPSON, SAMUEL CLARENCE	832 East One Hundred and Sixty-first st., New York City	Feb. 6, 1889
TODD, FRANK HERBERT	City Engineer, St. Cloud, Minn.	Feb. 6, 1889
WHEELER, SCHUYLER SKAATS	(Elected Junior, March 2, 1887), 322 Seventh ave., New York City	Feb. 6, 1889

ASSOCIATE.

LEWIS, JAMES FREDERICK	Rand Drill Co., 23 Park place, New York City	Feb. 6, 1889

JUNIORS.

ALLEN, THOMAS WARREN	129 West Sixty-first st., New York City	Dec. 5, 1888
FRENCH, JAMES BENTON	626 North Fortieth st., Philadelphia, Pa	Feb. 6, 1889
MCCORMICK, GEORGE KING	Assistant Engineer, Charleston, Cincinnati and Chicago R. R., Johnson City, Tenn	Feb. 6, 1889
POLLEDO, YSIDORO YGNACIO	Cardenas, Cuba	Jan. 2, 1889

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CHANGES AND CORRECTIONS.—MEMBERS.

APPLETON, ELLERY C.....Revere, Mass.
CRAIG, CHAMBERS M.....Principal Assistant Engineer Alabama Midland Ry., Bainbridge, Ga.
CUNNINGHAM, JAMES H.....26 Victoria st., London, S. W., England.
GREENE, JOSEPH N.....Bangor, Maine.
HENNY, DAVID C.....(With Howland & Ellis), 71 Equitable Building, Boston, Mass.
HUGHES, WILLIAM M.....Assistant General Manager Keystone Bridge Co., Pittsburgh, Pa.
MCKEE, CHARLES H.....Whitehall, N. Y.
MCLAIN, LOUIS R.....Contractor for Alabama Midland Ry., Ozark, Ala.
MOORE, ROBERT.....Chief Engineer St. Louis Merchants Bridge Terminal Ry., Laclede Building, St. Louis, Mo.
NICHOLS, OTHNIEL F.....Chief Engineer Union and Brooklyn Elevated Ry., 31 Sands st., Brooklyn, N. Y.
PARKHURST, HENRY W.....Resident Engineer St. Louis Merchants Bridge, 64 Laclede Building, St. Louis, Mo.
SCHAUB, JULIUS W.....Engineer Detroit Bridge and Iron Works, Detroit, Mich.
WHITFORD, OSCAR F.....Casilla, 34 D., Santiago, Chili.

ASSOCIATE.

HANDY, FRANK W.....Avondale, Cincinnati, Ohio.

JUNIORS.

GAHAGAN, WALTER H.....Assistant Engineer St. Louis Merchants Bridge, 64 Laclede Building, St. Louis, Mo.
HILDRETH, RUSSELL W.....Box 93, Phœnixville, Pa.
LANT, FRANK P.....243 West One Hundred and Thirty-third st., New York City.
MODJESKI, RALPH.....(Care Morison & Corthell), 205 La Salle st., Chicago, Ill.
MYERS, EDMUND T. D., JR.....Assistant to President Richmond Locomotive and Machine Works, Richmond, Va.
PURDY, CORYDON T.....168 Washington st., Chicago, Ill.
VAUGHAN, GEORGE W.....Division Engineer New York, Chicago and St. Louis Ry., Broadway Depot, Cleveland, Ohio.

RESIGNATIONS.

DANA, JAMES J..... December 31, 1888
MARTIN, WILLIAM H..... December 31, 1888

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DEATHS.

BARBOUR, WILLIAM S.....Elected Member April 17, 1872; died February 24, 1889.

BAUMANN, EDWARD.....Elected Associate June 2, 1880; died January 23, 1889.

FELTON, SAMUEL M.....Elected Fellow March 23, 1870; died January 24, 1889.

PHILBRICK, EDWARD S.....Elected Member September 6, 1874; died February 13, 1889.

March, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MARCH 6TH, 1889.—The Society met at 20 o'clock, President M. J. Becker in the Chair; John Bogart, Secretary. Ballots were canvassed and the following candidates declared elected. As Members: Walter Linsley Cowles, Cleveland, O.; Paul Didier, Pittsburgh, Pa.; Herbert Samuel Holt, Sherbrooke, Canada; William Charles Kernot, Melbourne, Australia; Henry Kinder Owens, Seattle, Wash.; Andrew McClean Parker, New York City; Albert Hezekiah Porter, Cleveland, O.; Walter Percival Rice, Cleveland, O. As Juniors: Stewart Johnston, Pittsburgh, Pa.; Augustus Sayre Kibbe, Albany, N. Y.; Walter Frank Whittemore, Hoboken, N. J.

The Secretary announced the death of William S. Barbour, M. Am. Soc. C. E., on February 24th, 1889; the death of Edward Baumann, Assoc. Am. Soc. C. E., on January 23d, 1889, and the death of Edward S. Philbrick, M. Am. Soc. C. E., on February 13th, 1889.

The Norman Medal for the year ending August 1st, 1888, awarded to E. E. Russell Tratman, Jun. Am. Soc. C. E., for his paper on "English Railroad Track," was presented to Mr. Tratman.

A discussion of the paper on "English Railroad Track," by James H. Cunningham, M. Am. Soc. C. E., was read by the Secretary, and the subject was discussed by Messrs. Sloan, T. C. Clarke, Becker, Croes, Brendlinger, Wegmann, Devin, Buck and Tratman.

MARCH 20TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair.

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Announcements were made by the Chairman of the Committee in charge of arrangements for the proposed European trip, Dr. Charles E. Emery, as to the progress of those arrangements.

Some twenty pictures of the construction of the Forth Bridge, presented by Charles Macdonald, M. Am. Soc. C. E., were shown by means of the stereopticon, and the subject was discussed by Messrs. Charles Macdonald, William H. Paine, T. C. Clarke, H. W. Brinckerhoff, Theodore Cooper and J. H. Staats.

OF THE BOARD OF DIRECTION.

JANUARY 3D, 1889.—Applications were considered. Committee on Annual Meeting was appointed. The report of the Committee on the proposed addition to the Society House was considered, and it was, on motion, resolved that the erection, under the direction of the Committee, be ordered, at an expense not to exceed $5 000. Appropriations were made.

JANUARY 15TH, 1889.—Arrangements for Annual Meeting were considered. Annual Report adopted.

FEBRUARY 7TH, 1889.—Applications were considered. Appropriations were made. The subject of original papers for the Transactions was considered. Financial business transacted.

MARCH 7TH, 1889.—Applications were considered. The subject of the time and place for the next Annual Convention was considered.

MEMOIRS OF DECEASED MEMBERS.

GEORGE AINSLIE, F. Am. Soc. C. E.

DIED SEPTEMBER 6TH, 1878.

George Ainslie, F. Am. Soc. C. E., died at Louisville, Ky., September 6th, 1878. He was born in Edinburgh, Scotland, in 1814, and came to Louisville in 1826, with his father, Hew. Ainslie, the Scottish poet, who died at Louisville in 1879.

Mr. George Ainslie, soon after arriving in Louisville, became an apprentice in the old Franklin foundry of the firm of Glover, McDougal & Co. After his service as an apprentice, he acted on his own account as a mechanic for several years, and then became a partner in the foundry firm of Inman, Gault & Co., which afterward was succeeded by Glover,

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Gault & Co., and, in 1854, by Glover, Ainslie & Cochran. Subsequently Messrs. Ainslie and Cochran established a firm which continued under the name of Ainslie, Cochran & Co. up to the time of Mr. Ainslie's death.

Mr. Ainslie was successful in his business life; his practical knowledge of mechanics, added to the experience of years, enabled him to take charge of large interests. He was very liberal in his business relations and took a prominent part in the general affairs of the city in which he spent his life. He was a member of the City Council and a director in a number of the larger business interests of Louisville. He was prominent in the management of the Louisville Water Company, a director of the Short Line Railway Company and a manager of the House of Refuge. The general expression of regret which occurred on the occasion of Mr. Ainslie's death showed the very high appreciation in which he was held in the City of Louisville.

GILMAN TRAFTON, M. Am. Soc. C. E.

DIED MAY 25TH, 1887.

Near one of the quiet avenues which wind between lofty trees that shade the grassy slopes of Cave Hill Cemetery, the beautiful City of the Dead, near Louisville, Ky., is the grave of Gilman Trafton, a Member of the American Society of Civil Engineers since May 15th, 1872.

He was the son of Leonard F. and Sarah H. Trafton, and was born at New Market, N. H., October 11th, 1835.

After a preparatory course at Bangor, Me., he entered the Rensselaer Polytechnic Institute at Troy, N. Y., in October, 1853, and graduated with high honors in the class of 1856.

For a short time he was employed as an assistant by Smith & Parkinson, Civil Engineers at Buffalo, N. Y., and then removed to Nashville, Tenn., where he obtained employment in the office of Mr. Adna Anderson, at that time chief engineer of different lines of railroad centering at Nashville.

In November, 1858, Professor O. H. P. Bennett, who had been selected as the engineer on the part of the State of Tennessee in the establishment of the boundary line between that State and Kentucky, offered Mr. Trafton the position of assistant. This he accepted, and performed the duties until about March 1st, 1859, when he was appointed the engineer on the part of Kentucky upon the same survey. The work was com-

Committee to prepare Memoir, Mr. Wilbur F. Foster, M. Am. Soc. C. E.

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pleted in November, 1859, the entire boundary line from the Mississippi River to Cumberland Gap having been carefully located and permanently marked during the twelve months that the party was in the field.

Mr. Trafton then accepted the position of assistant with Mr. J. H. Devereux, who was then City Engineer of Nashville, Tenn., and remained until the outbreak of the war in April, 1861.

From this time until Nashville was occupied by the armies of the United States Mr. Trafton was engaged in military surveys, with a view to the construction of defensive works around the City of Nashville, by the State of Tennessee.

Subsequently he was in the Military Railroad Service, and from February, 1864, until the close of the war he was assistant to General Superintendent Government Railroads, Military Division of the Mississippi.

In the summer of 1865 he removed to Louisville, Ky., and participated in the formation of the Louisville Bridge and Iron Company, of which he was the engineer from its organization until shortly before his death.

It is said of him by one eminent in the same profession that he "had few equals as a bridge engineer." His rapid and accurate work, his correct judgment, and his habits of laborious, untiring industry were proverbial, and his early death was doubtless due to excessive professional overwork.

In December, 1885, he left New York for Japan in a sailing vessel, with the hope of throwing off a threatened softening of the brain. Returning in July, 1886, but little benefited, he remained at Louisville, unable to participate in business affairs, until the disease mastered him and he died May 25th, 1887.

Mr. Trafton was never married, and it only remains to bear willing testimony to his high personal qualities as a man. In the language of an old associate, "he was a noble man, strict and correct in all his dealings, kind and courteous in all his intercourse." Modest and unassuming, his integrity and uprightness of character were beyond reproach, his kindness as gentle as that of a woman, and his devotion to friends like bars of triple steel.

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FREDERIC WILLIS VAUGHAN, M. Am. Soc. C. E.

DIED OCTOBER 19TH, 1887.

Frederic Willis Vaughan, son of Lewis and Susan J. Vaughan, was born in Warren, Knox County, Me., on January 16th, 1844. He was prepared at the academy in Warren for admission to the Rensselaer Polytechnic Institute, from which he graduated with high honors in the class of 1863.

During the fall of 1863 he received the appointment of Third Assistant Engineer in the United States Navy. This position he resigned before having been assigned to duty, in order to accept the position of Assistant Engineer in the United States Military Railway Service, with headquarters at Nashville, Tenn. Arriving at Nashville in January, 1864, remained in the Government Railway Service until October, 1865, at which time he removed to Louisville, Ky., and entered the employment of the Louisville Bridge and Iron Company as Assistant Engineer. He remained in this position until the commencement of work on the Ohio River Bridge, at Louisville, of which he became Principal Assistant Engineer.

Owing to the failure of the contractors for the masonry to proceed promptly with their work, the Bridge Company assumed the task of construction, and the entire work was intrusted to the personal direction and supervision of Mr. Vaughan. Though scarcely twenty-five years of age, he displayed such marked qualities as an engineer and as a man of executive ability as to place him in the front rank of those capable of conducting large enterprises.

On the completion of the Ohio River Bridge Mr. Vaughan returned, January 16th, 1871, to the service of the Louisville Bridge and Iron Company, as Engineer. He became a Director of this Company, and was elected Vice-President and Chief Engineer April 1st, 1873, and President March 15th, 1879. From this time to the day of his death he controlled and directed the affairs of the company, which has, under his direction, designed and built numberless bridges, amounting in total length to upwards of 20 miles.

From July 18th, 1881, to December 21st, 1883, Mr. Vaughan served as arbitrator on the part of the Louisville Gas Company in the matter of differences between the Gas Company and the City of Louisville, relative to charges for public lights. This work was conducted in the thorough manner which characterized his treatment of any subject, and resulted in an agreement by which settlement was made between the city and the Gas Company.

Committee to prepare Memoir—Mr. Albert Fink, M. Am. Soc. C. E.; Mr. O. F. Nichols, M. Am. Soc. C. E.; and Mr. J. W. Putnam, M. Am. Soc. C. E.

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He was consulting engineer of the Henderson Bridge Company from September 28th, 1881, to April 1st, 1882, when this office was abolished, and he became Chief Engineer, retaining this position until his death. The design and execution of this work interested him exceedingly. His familiarity with the Central Southern States and their railroad interests made him realize the importance of this structure as a feature of the railroad systems between the Central, South, and the North and West, and led him to endeavor to make this bridge a work of strength and utility. It stands to-day a monument to his personal energy and professional attainments.

On January 1st, 1883, Mr. Vaughan was made Consulting Engineer of the Louisville and Nashville Railroad Company, and held the position till his death. Under his supervision nearly all the more important bridges of this railroad system were reconstructed to meet the requirements of increased traffic and the consequent use of heavier locomotives.

In the spring of 1884, during the construction of the Henderson Bridge, Mr. Vaughan had a severe attack of pneumonia, from which he never fully recovered. After this illness he was obliged to spend his winters in the South, and his health was so shattered that he worked at great disadvantage in carrying his important works to completion.

On September 26th, 1887, while inspecting the construction of the foundation for a heavy machine at the works of the Louisville Bridge and Iron Company, he was taken suddenly ill and nearly died of suffocation, from which he had suffered greatly at intervals.

From this time he was practically confined to the house, though confined to his room but a few days previous to his death. His chief suffering during his last illness was from a severe cough and from shortness of breath. He died of dilation of the heart at Louisville, Ky., on October 19th, 1887, at 3.30 A. M., and was buried at Cave Hill Cemetery.

Mr. Vaughan was married May 3d, 1869, to Margaret D. Edgar, of St. John, New Brunswick, who with their two sons, Edgar and Walter Lewis, survives him.

He became a member of the American Society of Civil Engineers on February 17th, 1869, and was elected a director in 1885.

Of a strong social and domestic disposition, Mr. Vaughan was an ideal husband and father; he made friends easily; his friendships were strong, and his devotion to them great.

His loyalty and devotion to the various interests which demanded his attention was unqualified, and his consideration of his business associates was as great as is often found in a man so intensely devoted to business interests.

His strong personality and untiring energy, limited only by his physical strength, made him easily one of the foremost Engineers of the

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Central States of Kentucky and Tennessee during the period from 1879 to the day of his death.

Possessed of a quick intellect and a wonderful memory, his engineering talent was exceeded by his business capacity. His loss is deeply felt by a large circle of friends, and will not be easily made good in the several positions which he had filled with so much credit to himself and such advantage to the interests involved.

SPRINGER HARBAUGH, F. Am. Soc. C. E.

DIED DECEMBER 8TH, 1887.

Mr. Springer Harbaugh, a Fellow of the American Society of Civil Engineers, died at his residence in St. Paul, Minn., on December 8th, 1887.

The deceased was born at New Lisbon, Ohio, March 16th, 1816. In 1840 he removed to Pittsburgh, Pa., where he first engaged in the commission business, and afterward became very largely identified with the iron trade, being one of the proprietors of the Superior Rail Mill, then considered the largest in the country. Mr. Harbaugh was one of the two original Directors of the Union Pacific Railroad appointed by President Lincoln. He was re-appointed by President Johnson, when the number was increased to five. He was a Director of the Pittsburgh, Fort Wayne and Chicago Railroad, and was also officially connected with banks both in Pittsburgh and New York City. In 1880 Mr. Harbaugh removed to Minnesota and took charge of two of the largest farms in the Northwest, and the last years of his life were actively devoted to the advancement of Agriculture. He was a member of the Advisory Board of the State Agricultural College, and for three years Vice-President for Minnesota of the Farmers' National Congress, at whose session in November, 1887, in Chicago, he contracted the illness from which he died. He was a firm believer in the agricultural resources of the Northwest, and especially that portion with which he was most familiar, the Red River Valley. All who had the privilege of knowing Mr. Harbaugh will most cordially concur in the sentiments expressed in the following tribute to his memory, contributed to the *Pioneer Press* by an old friend of the deceased:

"It seems scarcely right that a life so full of kind thoughts and generous deeds should pass from among us without some recognition on

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Committee to prepare Memoir, Mr. L. L. C. Brooks.

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the part of those who have been favored with his friendship and have enjoyed his society.

"His public record belongs to the City of Pittsburgh, where he lived for more than forty years, and is associated to no inconsiderable extent with the history of the State of Pennsylvania. More than one successful business man, who owes his start in life to the practical character of Mr. Harbaugh's sympathy, still lives to bear witness to his value as a friend and counsellor."

His remains were interred at Pittsburgh, where the news of his death caused general regret.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
Cowles, Walter Linsley	Engineer King Iron Bridge and Manufacturing Co., Cleveland, Ohio	March 6, 1889
Didier, Paul	Chief Engineer Pittsburgh and Western Ry., Allegheny, Pa.	March 6, 1889
Porter, Albert Hezekiah	Engineer King Iron Bridge and Manufacturing Co., Cleveland, Ohio	March 6, 1889
Rice, Walter Percival	City Civil Engineer, Cleveland, Ohio	March 6, 1889

ASSOCIATE.

Trautwine, John Cresson, Jr.	3301 Haverford st., Philadelphia, Pa.	Dec. 5, 1888

JUNIOR.

Whittemore, Walter Frank	308 Garden st., Hoboken, N. J.,	March 6, 1889

CHANGES AND CORRECTIONS.

Booth, William H. ..... 40 Upper Tollington Park, Finsbury Park, London, N., England.
Bryson, Andrew ..... 12 Broadway, Room 44, New York City.
Carrel, Frederick J. ..... Spokane Falls, Wash.

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HOXIE, R. L.....Capt. Corps of Engineers U. S. A., Willets Point, Whitestone P. O., N.Y.
JACKSON, JONES M.....Schenectady, N. Y.
LONG, THOMAS J.....80 Washington Square, East, New York City.
MILLER, SILVANUS.....Superintendent Chinamit Mine, Las Quebrados, Isabal, Guatemala, Central America.
OSGOOD, JOSEPH O.....120 Broadway, New York City.
POU, ARTHUR.....Talbotton, Ga.
RUGGLES, WILLIAM B.....Fern Bank, Hamilton Co., Ohio.
SAFFORD, EDWARD S.....Chief Engineer Shelby Iron Works, Shelby, Ala.
SHEARER, SAMUEL H.....Engineer National Vulcanite Co., Ingalls Block, Room 7, Indianapolis, Ind.
SIMPSON, GEORGE F.....220 West One Hundred and Twenty-fourth st., New York City.
SMITH, WILLIAM SOOY.....Maywood, Cook Co., Ill.
SPENCER, SAMUEL.....(Care Drexel, Morgan & Co.), cor. Wall and Broad sts., New York City.
THOMPSON, WILLIAM G. M.....Resident Engineer Sault Ste. Marie Canal, Sault Ste. Marie, Ontario, Canada.
WASHBURN, FRANK S.....(Care Munroe & Co.), Paris, France.
WATKINS, FREDERICK W.....118 East One Hundred and Fifteenth st., New York City.
YEATMAN, CHARLES P.....Coalburg, Ala.

JUNIORS.

ADAMS, JULIUS L.....(Care Panama R. R.), Colon, U. S. Colombia.
LUCAS, D. JONES.....Lock Box 1142, Corry, Pa.
PRATT, MASON D.....(Tsclingi & Pratt), Dubuque, Iowa.
ROSENWEIG, ALFRED.....Chief Engineer "La Mexicana" Land and Mining Co., Mulegé, Baja California, Mexico.
YATES, PRESTON K.....Natchez, Miss.

DEATHS.

ALLIS, EDWARD P.....Elected Fellow August 4, 1883; died April 1, 1889.
ERICSSON, JOHN.....Elected Honorary Member October 2, 1879; died March 8, 1889.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV, April-May-June-July, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

APRIL 3D, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates were declared elected: Willard Beahan, St. Louis, Mo.; Edward Josiah Blake, St. Joseph, Mo.; Horace Joshua Campbell, Chicago, Ill.; William Watson Coe, Roanoke, Va.; Fayette Samuel Curtis, New Haven, Conn.; John Ripley Freeman (elected Junior June 7th, 1882), Boston, Mass.; Franz Germann, Colon, Isthmus Panama; Frank Pierce King, Denver, Col.; John Nicholas Pott, Wilkesbarre, Pa.; John James Robinson, Johnson City, Tenn.; Martinius Stixrud, Seattle, Wash.; Timothy Sidney White, Beaver Falls, Pa. As Juniors: William Bion Ewing, Chicago, Ill.; Elstner Fisher, Detroit, Mich.; John Edgar Griffith, Donald, British Columbia; Clifford Stephen Kelsey, New York City; Curtiss Millard, Yonkers, N. Y.; Benno Rohnert, Detroit, Mich.

The Secretary announced the death on April 1st, 1889, of Edward P. Allis, F. Am. Soc. C. E., and the death of John Ericsson, Hon. M. Am. Soc. C. E., on March 8th, 1889.

A paper by Emil Kuichling, M. Am. Soc. C. E., on the "Relation between the Rainfall and the Discharge of Sewers in Populous Districts," was read by the Secretary, and discussed by Messrs. Rudolph Hering, Chas. P. Brush and A. Fteley.

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APRIL 17TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair; John Bogart, Secretary. A paper on the Improvement of the Mississippi River, by William Starling, M. Am. Soc. C. E., was read and discussed by Messrs. Emery, Striedinger, T. C. Clarke, Collingwood, C. J. H. Woodbury, Worthen, and H. W. Brinckerhoff.

Mr. Herman Schussler, C. E., exhibited by request drawings and plans of engineering constructions executed under his direction on the Pacific coast, and explained them in detail.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BARTLETT, WINTHROP,	Engineer in charge Olive st. Cable Line, Missouri R. R., 3303 Olive st., St. Louis, Mo.	Jan. 2, 1889
BEAHAN, WILLARD	North and South American Construction Co., Calle de la Moneda 38, Santiago, Chili.	April 3, 1889
BLAKE, EDWARD JOSIAH	Chief Engineer Hannibal and St. Joseph R. R., and Kansas City, St. Joseph and Council Bluffs R. R., St. Joseph, Mo.	April 3, 1889
COE, WILLIAM WATSON	Chief Engineer Norfolk and Western R. R., Roanoke, Va.	April 3, 1889
CURTIS, FAYETTE SAMUEL	Chief Engineer New York, New Haven and Hartford R. R., New Haven, Conn.	April 3, 1889
FREEMAN, JOHN RIPLEY	(Elected Junior, June 7, 1882.) Hydraulic Engineer and Inspector Associated Factory Mutual Insurance Co., 31 Milk st., Boston, Mass.	April 3, 1889
HOLT, HERBERT SAMUEL	Sherbrooke, Quebec, Canada...	March 6, 1889
KING, FRANK PIERCE	Assistant Chief Engineer Denver and Rio Grande Ry., 17 Cheesman Block, Denver, Colo	April 3, 1889
LANDRETH, WILLIAM BARKER	Constructing Engineer, Sewer Commissioners, Amsterdam, N. Y.	Oct. 3, 1888

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POTT, JOHN NICHOLAS.....Mining Engineer Wyoming Div. Lehigh and Wilkes-Barre Coal Co., Wilkes-Barre, Pa..... April 3, 1889

STIXRUD, MARTINIUS.....Engineer Construction, Seattle, Lake Shore and Eastern Ry., Seattle, Wash..... April 3, 1889

STONE, EDWARD HERBERT.....In charge Construction Section, Office Director-General of Railways, Simla, India..... Dec. 5, 1888

ASSOCIATE.

WATKINS, JOHN ELFRETH .....Engineer Property and Curator, Section Transportation and Engineering, U. S. National Museum, Washington, D. C. Jan. 2, 1889

JUNIORS.

EWING, WILLIAM BION.....Assistant Engineer Chicago and North Western Ry., 4136 Ellis ave., Chicago, Ill..... April 3, 1889

FISHER, ELSTNER.....Assistant Engineer Michigan Central R. R., Detroit, Mich. April 3, 1889

GRIFFITH, JOHN EDGAR.....Resident Engineer Canadian Pacific Ry., Donald, B. C... April 3, 1889

KELSEY, CLIFFORD STEPHEN ...82 Army Building, New York City..... April 3, 1889

MILLARD, CURTISS .....(Care D. R. Paige & Co.) Brewster, N. Y..... April 3, 1889

ROHNERT, BENNO .....U. S. Engineers' Office, Sault Ste. Marie, Mich..... April 3, 1889

WOOD, CHARLES FRANCIS.....Assistant in City Engineer Department, 18 City Hall, New Haven, Conn.... ..... Dec. 5, 1888

CHANGES AND CORRECTIONS.

MEMBERS.

AMWEG, FREDERICK J.....Chief Engineer City Ave. and Germantown Bridge Co., Keystone Bank Bldg., Philadelphia, Pa.

APPLETON, THOMAS.....Resident Engineer Union Pacific Ry., Omaha, Neb.

ATWOOD, WILLIAM H.....79 Adelbert st., Cleveland, Ohio.

BALDWIN, WILLIAM J.....Advisory Engineer Warming and Ventilating Buildings, etc., 277 Pearl st., New York City.

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BAXTER, GEORGE S.....Treasurer Northern Pacific R. R., 17 Broad st., New York City.

BECKWITH, LEONARD F.....Chief Engineer Consolidated Telegraph and Electrical Subway Co., 18 Cortlandt st., New York City.

BILLIN, CHARLES E.....95 Fifth ave., Room 63, Pittsburgh, Pa.

BLACKFORD, FRANCIS W., JR.....Anaconda, Mont.

BLICKENSDERFER, JACOB.....Consulting Engineer Union Pacific Ry., Oakland, Mo.

BLICKENSDERFER, ROBERT.....Oakland, Mo.

BONZANO, MAXIMILIAN F.....Superintendent Philadelphia and New York Div. Philadelphia and Reading R. R., 900 Green st., Philadelphia, Pa.

BOOTH, WILLIAM H.....Mechanical Engineer London Central Subway Ry., Leadenhall House, London, E. C., England.

BRACKENRIDGE, WILLIAM A. ...Toms River, Ocean Co., N. J.

BRINCKERHOFF, H. WALLER....Office of *The Engineering and Building Record*, 277 Pearl st., New York City.

BRINSMADE, DANIEL S.....Engineer Ousatonic Water Co., Birmingham, Conn.

BRODHEAD, CALVIN E.....Lehigh Coal and Iron Co., cor. Third and Cedar sts., St. Paul, Minn.

BURNET, GEORGE.....Street Commissioner, St. Louis, Mo.

CHILDS, JAMES E.....Assistant General Manager Lake Shore and Michigan Southern R. R., Cleveland, Ohio.

COFFIN, WILLIAM B.....Superintendent New York, Lake Erie and Western R. R., Susquehanna, Pa.

COMSTOCK, CYRUS B.....Col. Corps of Engineers, Bvt. Brig.-Gen. U. S. A., Army Bldg., New York City.

CONSTABLE, CASIMIR.....Constableville, N. Y.

CORNELL, OLIVER H. P.....Chief Engineer Cincinnati, Alabama and Atlantic R. R., Tullahoma, Tenn.

DELAFIELD, CLARENCE.....2 Wall st., New York City.

DEYO, S. L. F. .....Assistant Engineer New York, New Haven and Hartford R. R., 10 East One Hundred and Nineteenth st., New York City.

DU BARRY, JOSEPH N.....Second Vice-President Penn. R. R., 233 South Fourth st., Philadelphia, Pa.

DUN, JAMES.....Chief Engineer St. Louis and San Francisco R. R., Seventh and Cerre sts., St. Louis, Mo.

EGGLESTON, T. C.....Engineer Maintenance of Way, Chesapeake and Ohio Ry., Richmond, Va.

ENGLE, ROBERT L.....Lincoln ave., Walnut Hills, Cincinnati, Ohio.

FILLEY, HIEL H.....Chief Engineer Mexican National Construction Co., Security Bldg., Kansas City, Mo.

FISHER, EDWIN A.....Division Engineer Maintenance of Way Western New York and Penn. R. R., and Chief Engineer Rochester Electric Ry., Rochester, N. Y.

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FLAD, EDWARD.....Civil and Mechanical Engineer, Laclede Bldg., St. Louis, Mo.

FORNEY, MATTHIAS N.....Editor *Railroad and Engineering Journal*, 145 Broadway, New York City.

FOUQUET, JOHN D.....Architect New York Central and Hudson River R. R., Room 21, Grand Central Station, New York City.

FULTON, JOHN A.....Resident Engineer Toledo, St. Louis and Kansas City R. R., Toledo, Ohio.

GILBERT, CHARLES P.....Secretary and Manager Edison Illuminating Co., Detroit, Mich.

GILLHAM, ROBERT.....19 Gibraltar Bldg., Kansas City, Mo.

GOLDMARK, HENRY.....Engineer Bridges Kansas City, Ft. Scott and Memphis R. R., Kansas City, Mo.

GOODWIN, H. STANLEY.....General Eastern Superintendent Lehigh Valley R. R., South Bethlehem, Pa.

GRIMSHAW, J. WALTER.....Australian Club, Bent st., Sydney, N. S. W., Australia.

HARLOWE, CHARLES.....1417 Sixth st., S. E. Minneapolis, Minn.

HARROD, BENJAMIN M.....City Engineer, City Hall, Room 19, New Orleans, La.

HAYES, R. SOMERS.....32 Nassau st. (Residence, 39 West Thirty-eighth st.), New York City.

HOUSE, BRUCE F.....Assistant Engineer San Antonio and Arkansas Pass. Ry., Fredericksburg, Texas.

HUDSON, JOHN R.....Pomona, Los Angeles Co., Cal.

JENKINS, WILLIAM D.....Consulting and Civil Engineer (Waddell and Jenkins), Keith and Perry Bldg., Kansas City, Mo.

JENNINGS, WILLIAM H.....180 Washington ave., Columbus, Ohio.

KEEFER, GEORGE A.....Victoria, B. C.

KINGMAN, LEWIS.....City Engineer, Topeka, Kansas.

KIERSTED, W.....Chief Engineer The Central Water Works Construction Co., 509 Baird Bldg., Kansas City, Mo.

KINSLEY, THOMAS P.....421 Warren st., Syracuse, N. Y.

KNIGHT, WILLIAM B.....Civil Engineer, Kansas City, Mo.

LATHAM, HARRY H.....Consulting Engineer and Manufacturer of Machinery. 304 & 306 Dearborn st., Chicago, Ill.

LE CONTE, LOUIS J.....Assistant U. S. Engineer in charge Oakland Harbor Works, P. O. Box 358, Oakland, Cal.

LEWIS, EVERETT W.....Fertile, Minn.

LONG, THOMAS J.....(Care Union Bridge Co.), 1 Broadway, New York City.

LUCAS, D. JONES.....(Care Am. Soc. C. E.), 127 East Twenty-third st., New York City.

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MAIS, HENRY C.....Consulting Engineer, 61 Queen st., Melbourne, Victoria, Australia.

MAN, ALBON P., JR.....General Manager and Acting Chief Engineer Silver Springs, Ocala and Gulf R. R , Ocala, Fla.

MAY, WILLIAM A.....Superintendent Hillside Coal and Iron Co., Drawer U, Scranton, Pa.

MCCOOL, DANIEL.....General Manager California Southern R. R. and California Central Ry., Los Angeles, Cal.

MERSEREAU, CHARLES V.....Assistant Engineer St. Louis Water Works Extension, St. Louis, Mo.

MILLER, J. IMBRIE.....3928 Walnut st., Philadelphia, Pa.

MOORE, CHARLES E.....Civil Engineer, Santa Clara, Cal.

NOBLE, ALFRED.....Memphis, Tenn.

POST, JAMES C.....Maj. Corps Engineers, U. S. A. (care U. S. Legation), London, England.

PRENDERGAST, FRANCIS E.....Resident Engineer St. Mary's Falls Water Power Co., Sault Ste. Marie, Mich.

PURDON, CHARLES D.....Resident Engineer Cumberland Valley Branch L. and N. R. R., Pineville, Ky.

RAFTER, GEORGE W.....Civil and Sanitary Engineer, 32 City Hall, Rochester, N. Y.

RAY, NATHANIEL C.....(Ray & Moulthrop), Butte, Montana.

RICHARDSON, THOMAS F.....Locating Engineer Manitou and Pike's Peak R. R., Manitou, Colo.

RICKON, FREDERICK J. H.....City Engineer, Little Rock, Ark.

ROBERTS, PERCIVAL, JR.....261 South Fourth st., Philadelphia, Pa.

SAUNDERS, WILLIAM L.....Secretary and Engineer, Ingersoll-Sergeant Rock Drill Co., 10 Park Place, New York City.

SCHAEFFER, JOHN S.....Civil Engineer, 191 Littleton ave., Newark, N. J.

SCHMIDT, MAX O. E.....(Care Am. Soc. C. E.), 127 East Twenty-third st., New York City.

SCHNEIDER, CHARLES C.....Chief Engineer Pencoyd Bridge and Construction Co., 261 South Fourth st., Philadelphia, Pa.

SCOVILL, E. TRACY.....22 Walnut st., Cleveland, Ohio.

SIMPSON, GEORGE F.....(Care Am. Soc. C. E.), 127 East Twenty-third st , New York City.

SKILTON, GEORGE S .....68 Columbia Heights, Brooklyn, N. Y.

SPROULE, WILLIAM J.....Principal Assistant Engineer Harbor Trust, Montreal, Canada.

STROBEL, CHARLES L.....Consulting Engineer, Keystone Bridge Co., 205 La Salle st., Chicago, Ill.

VANCE, HART.....Civil Engineer, Middleport, Ohio.

VARONA, IGNACIO M. DE.....163 East Sixtieth st., New York City.

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WADDELL, JOHN A. L .....Consulting Bridge Engineer, Keith and Perry Building, cor. Ninth and Walnut sts., Kansas City, Mo.
WALLACE, JOHN F.. .....(Care E. L. Corthell), 205 La Salle st., Chicago, Ill.
WEISKOPF, SAMUEL C.....Room 314, Penn Building, Pittsburgh, Pa.
WENTWORTH, CHARLES C.....Engineer and Manager American Bridge and Iron Co., Roanoke, Va.
WHITCOMB, HENRY D.....Consulting Engineer, Chesapeake and Ohio Ry., Richmond, Va.
WIGHTMAN, WILLARD H.....Ashland, Oregon.
WILDER, FRANCIS M .....Assistant to President U. S. Rolling Stock Co., Hegewisch, Ill.
WIMMER, SEBASTIEN.....Civil Engineer, St. Mary's, Elk Co., Pa.
WISNER, GEORGE Y.....Resident Engineer Brazos River Channel and Dock Co., Velasco, Texas.

ASSOCIATES.

GIBSON, WILLIAM, JR.....Publisher *The Engineering and Building Record*, 277 Pearl st. (P. O. Box 3037), New York City.
NICOL, THOMAS W.....Chief Engineer Mobile, Jackson and Kansas City R. R., 36 St. Francis st., Mobile, Ala.
PRATT, ROBERT J.....Electrical Engineer, Residence Greenbush, N.Y.
PUTNAM, JOSEPH W.....34 St. Charles st. (Drawer 253), New Orleans, La.
STONE, WATERMAN .....General Manager Inter-State Consolidated Rapid Transit Ry., Kansas City, Kans.
YOUNG, FREDERICK S.....Assistant to President of, and the Secretary, Gilbert Car Mfg. Co., Troy Club, Troy, N.Y.

JUNIORS.

ALLEN, THOMAS W.....161 East Thirty-fourth st., New York City.
BAIER, JULIUS.....Assistant Engineer Merchants' Terminal Ry., 52 Laclede Building, St. Louis, Mo.
BAINBRIDGE, FRANCIS H.....Assistant Engineer Edge Moor Bridge Works, Wilmington, Del.
BENSEL, JOHN A.....Assistant Supervisor Division A, Pennsylvania R. R., Jersey City, N. J.
BISSELL, FRANK E.....Chief Engineer and Acting Superintendent Denver, Texas and Fort Worth R. R., Room 75, Railroad Building, Denver, Colo.
BLANC, FREDERICK N.....53 Cedar st., New York City.
BRERETON, THOMAS J.....Supervisor Tyrone Division Pennsylvania R. R , Osceola, Pa.
CARRÈRE, J. MAXWELL.....(Care Carrère and Haas Iron Works), 36 Park Place, New York City.
CARROLL, EUGENE.....Resident Engineer Light, Heat and Water Co., Jackson, Miss.

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DAY, G. FREDERICK P.....Box 916, Pasadena, Cal.
FARLEY, GEORGE M.....Engineer Maintenance of Way, New York and New England R. R., Boston, Mass.
FULLER, WILLIAM B.....City Engineer, City Hall, Duluth, Minn.
HAWKS, ARCHIE McL.....(Land & Hawks, Hydraulic Engineers), 23 Essex Building, Denver, Colo.
KASTL, ALEXANDER E.....Assistant Engineer Brazos River Dock and Channel Co., Velasco, Texas.
KONDO, TORAGORO.....(Care Engineering College, Imperial University) Tokio, Japan.
MYERS, EDMUND T. D., JR.....Assistant to President Richmond Locomotive and Machine Works, Richmond, Va.
SHALER, IRA A.....East View, Westchester Co., N. Y.
STARR, WILLIAM H .....Superintendent Delaware Division New York, Lake Erie and Western R. R., Port Jervis, N. Y.

FELLOWS.

COIT, EDWARD W.....402 Walnut st., Philadelphia, Pa.
COLBY, CHARLES L.....President Chicago and Great Western R. R., 36 Wall st., New York City.

DEATH.

SMITH, CHARLES C.....Elected member July 10, 1872; died April 17, 1889.

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MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MAY 1ST, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair; John Bogart, Secretary. Ballots for membership were canvassed and the following persons were declared elected. As members: Charles Jarvis Bates, New York City; Cornelius Conway Felton Bent, Cincinnati, O.; Charles Titus Church, Saratoga Springs, N. Y.; Charles Samuel Churchill, Roanoke, Va.; Harry Frazier, Hopkinsville, Ky.; George Porter Hilton, Albany, N. Y.; Howard George Kelley, Texarkana, Tex.; Frank Oscar Maxson, Washington, D. C.; George Nathan Merrill, Stanfordville, N. Y.; Andrew Wendelbo Münster, St. Paul, Minn.; Joseph Ramsey, Jr., Cincinnati, O.; James Eager Willard, West Point, Ky. As Associate: William Latham Abbott, Pittsburgh, Pa. As Juniors: John Nelson Hayward Cornell, New York City; Will Edwin Crane, Pittsburgh, Pa.; Alfred Burnham Ellsworth, Pittsburgh, Pa.; Oscar Erlandsen, Poughkeepsie, N. Y.; William Lindsay Ferguson, Philadelphia, Pa.

The Secretary announced the death on April 17th, 1889, of Charles C. Smith, M. Am. Soc. C. E.

Mr. J. J. R. Croes, M. Am. Soc. C. E., introduced a minute, which, on motion, was ordered spread upon the minutes of the Society; it is as follows:

In the commemoration of the assumption of office by the first President of the United States, one hundred years ago, the American Society of Civil Engineers may properly take part and pay a tribute to the memory of Washington.

Before he became a soldier, long before he entered on his career as a statesman, his inclination led him in the direction of engineering. We are told by his biographers that he was of a mathematical turn of mind, and that his first public occupation was that of a surveyor.

At that early period, before great public works had been or could be undertaken, division and development of land was the principal field of engineering, and was the essential preliminary to that knowledge of the resources of the country and of the needs for their development which must precede the formulating and carrying out of any works in which the skill of the constructing engineeer is brought into play.

Into this field Washington entered, and not only made extensive surveys, but also designed and executed some works which are still extant for the improvement of the channels of Virginia rivers.

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He might have turned his attention to the chief occupation of the gentlemen of his day and neighborhood, the cultivation of his farms; but he preferred the broader field of promoting the extension of the areas of farming land, and the means of transporting its products to a market. He might have taken up the practice of one of the so-called learned professions, law or theology, but he was content to obey the law and the Gospel as they stood, neither perverting the one nor controverting the other.

We may well imagine that if he had pursued the course which he began, he would have become eminent as a civil engineer; for he displayed in his career the characteristics which go to make up the highest grade of that profession, breadth of view, careful attention to detail, caution in examination, firmness in decision, vigor in action.

During his official life, he was careful to intrust work requiring engineering skill to educated and experienced engineers. He secured the services of Major L'Enfant of the French army as his chief of engineers, and to him was later intrusted the laying out of the City of Washington.

In the promotion of great enterprises for the improvement of the country, the talents and characteristics which Washington possessed would have been of the greatest value. That he was called off from such a field by the necessities of war, and later by the unanimous recognition by the people of his fitness for managing affairs of state, does not lessen our obligation to recognize him as one of the earliest members of our profession in this country.

It should inspire us to emulate his example, and to endeavor to make ourselves worthy of the wonderfully beautiful and apt characterization of him by the poet Whittier—

> "The one man equal to his trust—
> Wiser than lore, and without weakness good,
> Calm in the strength of unflawed rectitude."

Vice-President Fteley stated that in connection with the celebration of the Centennial Inauguration of George Washington as President of the United States, it was his pleasant duty, in the absence of the President of the Society, to sign the address presented to the President of the United States, in behalf of the civic, commercial, industrial and scientific organizations represented in the celebration. The address was then read, and, on motion, was ordered spread upon the minutes of the Society. It is as follows:

To Benjamin Harrison, April 30th, 1889.

President of the United States:

The undersigned, representatives of the civic, commercial, industrial and educational organizations and bodies of the City of New York, on the occasion of this centennial celebration of the inauguration of Washington, the first President, present anew to the President of the United States, in his official capacity, their allegiance to the Government, Constitution and the laws, with their congratulation upon the completion of a century of constitutional government and the progress made in that century.

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A paper by George W. Rafter, M. Am. Soc. C. E., on the "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," was read by the author and illustrated by the microscope.

The subject was discussed by Messrs. Brush, Worthen, Collingwood and Professor Leeds.

MAY 15TH, 1889.—The Society met at 20 o'clock; William E. Worthen, Past President, in the chair; John Bogart, Secretary.

The Secretary announced the death on May 4th, 1889, of Major A. B. Rogers, M. Am. Soc. C. E.

The paper on "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," by G. W. Rafter, M. Am. Soc. C. E., which was read at the last meeting, was discussed by Messrs. Kuichling, Fteley, Brush, Worthen, Croes, Professors Waller and Leeds.

OF THE BOARD OF DIRECTION.

APRIL 4TH, 1889.—Applications were considered. General business transacted.

MAY 2D, 1889.—Applications were considered. A committee to determine details as to the convention was appointed. A communication from the Committee on Uniform Standard Time was considered. Appropriations made.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BATES, CHARLES JARVIS	Civil Engineer, 63 Broadway (P. O. Box 2702), New York City	May 1, 1889
BENT, CORNELIUS CONWAY FELTON	Superintendent Ohio and Mississippi River Ry., Cincinnati, Ohio	May 1, 1889
CHURCH, CHARLES TITUS	Saratoga Springs, N. Y.	May 1, 1889
CHURCHILL, CHARLES SAMUEL	Engineer Maintenance of Way Norfolk and Western R. R., Roanoke, Va.	May 1, 1889
FRAZIER, HARRY	Superintendent Maintenance of Way Chesapeake and Ohio Ry., Cincinnati, Ohio	May 1, 1889
HILTON, GEORGE PORTER	Engineer Hilton Bridge Construction Co., Albany, N. Y.	May 1, 1889

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KELLEY, HOWARD GEORGE.....Resident Engineer Maintenance of Way, St. Louis, Arkansas and Texas Ry., Texarkana, Texas..... May 1, 1889

MAXSON, FRANK OSCAR.....Civil Engineer United States Navy, 647 East Capitol st., Washington, D. C..... May 1, 1889

MERRILL, GEORGE NATHAN.....Resident Engineer Poughkeepsie and Connecticut R. R., 143 Catherine st., Springfield, Mass..... May 1, 1889

MÜNSTER, ANDREW WENDELBO..City Engineer's Office, St. Paul, Minn..... May 1, 1889

OWENS, HENRY KINDER .....(Scurry & Owens), Seattle, Wash. Mar. 6, 1889

ASSOCIATE.

ABBOTT, WILLIAM LATHAM.....Carnegie, Phipps & Co., Pittsburgh, Pa..... May 1, 1889

JUNIORS.

CRANE, WILL EDWIN .....Inspector Lassig Bridge and Iron Works, Pittsburgh, Pa.. May 1, 1889

ELLSWORTH, ALFRED BURNHAM..(Care Pittsburgh Testing Laboratory), Pittsburgh, Pa.... May 1, 1889

ERLANDSEN, OSCAR.....Pennsylvania, Poughkeepsie & Boston R. R., Portland, Pa.. May 1, 1889

FERGUSON, WILLIAM LINDSAY...1632 N. Fifteenth st., Philadelphia, Pa ..... May 1, 1889

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

NEWTON, JOHN.....President Panama R. R., Mills Building, New York City.

MEMBERS.

BUTTERFIELD, FRANCIS E.....Hotel Hidalgo, Monterey, Mexico.

CRAVEN, HENRY S..... .....Civil Engineer U. S. N., Navy Yard, N. Y.

DAVIS, FRANK P. .....Resident Engineer Nicaragua Canal Construction Co., Greytown, Nicaragua.

EARLEY, JOHN E.....Engineer for Bowes Scott, Read, Campbell & Co., Mexico; address, Irapuato, Guanajuato, Mexico.

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FARNHAM, ROSCOE E.....228 La Salle st., Room 53, Chicago, Ill.
HIDER, ARTHUR.....U. S. Assistant Engineer, Engineer in charge Improvements, Lake Providence Reach, Miss., Wilsons Point, La.
KILLEBREW, SAMUEL.....Brownsville, Tenn.
LOCKE, CHARLES A.....Assistant Engineer, Nashville, Tenn.
MCCLURE, WILBUR F.....Chief Engineer Los Angeles, Pasadena and Glendale Ry.; U. S. Deputy Mineral Surveyor, Garvanza, Cal.
MCKEE, CHARLES H.....Assistant Engineer New York Central and Hudson River R. R., Buffalo, N. Y.
MCKEE, SAMUEL B.....Assistant Engineer Ontario, Carbondale and Scranton Ry., Hancock, N. Y.
MOULTON, MACE.....Consulting Engineer Berlin Iron Bridge Co., East Berlin, Conn.
NELSON, GEORGE T.....Civil and Consulting Engineer, Room 16, Chamber of Commerce, Omaha, Neb.
O'ROURKE, JOHN F.....Engineer for Dawson, Symmes & Ussher, Contractors Chignecto Marine Transport Ry., Amherst, Nova Scotia.
OSBORN, FRANK C.....Engineer King Iron Bridge and Manufacturing Co., Cleveland, Ohio.
PETERSON, P. ALEX.....Consulting Engineer Canadian Pacific Ry., Montreal, Canada.
PRINCE, EDWARD.....Quincy, Ill.
RUTHERFURD, FRANCIS M.....Assistant Engineer Richmond and Danville R. R., Richmond, Va.
SANDERSON, J. GARDNER.....Rondout, N. Y.
SHANLY, JAMES M.....40 St. Mark st., Montreal, Canada.
SKINNER, FRANK W.....Editorial Staff *Engineering and Building Record*, 277 Pearl st., New York City.
STEPHENS, CLINTON F.....1230 Washington ave., St. Louis, Mo.
STOREY, WILLIAM B., JR.....Corner Fourth and Townsend sts., San Francisco, Cal.
THOMSON, JOHN.....Manufacturer of Printing and Embossing Presses and Water Meters, 11-13 Temple Court, New York City.
WILSON, ARTHUR OWEN.....Secretary, Treasurer and General Manager The Huntsville Belt Line and Monte Sano Ry., Huntsville, Ala.
WROTNOWSKI, ARTHUR F.....Engineer in charge Harbor Works, Tampico, Mexico.

JUNIOR.

KOBAYASHI, KAYAJIRO.....Sanitary Engineer to Sanitary Bureau, Home Dept., Tokio, Japan.

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DEATHS.

ANDERSON, ADNA.....Elected Member September 2, 1874; died May 15, 1889.

BENTLEY, HENRY A.....Elected Member March 2, 1881; died May 13, 1889.

MARSHALL, CHARLES A.....Elected Member October 1, 1884; died May 31, 1889.

ROGERS, ALBERT B.....Elected Member June 6, 1883; died May 4, 1889.

June, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JUNE 5TH, 1889.—The Society met at 20 o'clock, Vice-President Fteley in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As members: Martin Gay, West New Brighton, N. Y.; Julien Astin Hall, Washington, D. C.; Frank Nearing, Tarrytown, N. Y.; George Spencer Pierson, Kalamazoo, Mich.; Arthur Burr Starr, Allegheny, Pa. As Associates: Jules Breuchaud, New York City; Kiosaburo Futami, Kansas City, Mo.; John Vose Hazen, Hanover, N. H.; Millard Hunsiker, Pittsburgh, Pa.; Frank Clifford Lewis, Mount Vernon, O. As Juniors: William Channing Cushing, Zanesville, O.; Thomas Francis Lawlor, Poughkeepsie, N. Y.; Merritt Haviland Smith, Jr., New York City.

The Secretary announced the death, on May 15th, 1889, of General Adna Anderson, M. Am. Soc. C. E.; and the death on May 31st, 1889, of Mr. Charles A. Marshall. M. Am. Soc. C. E.

Mr. William P. Shinn, Director Am. Soc. C. E., gave some account of the recent disaster at Johnstown, Pa., and the subject was discussed by Messrs. Flagg, Brendlinger, North, John Bogart, Croes, Skinner, Fteley, A. H. Simpson, George S. Rice and W. P. Shinn.

On motion, the following committee was appointed to visit the scene of the disaster and report to the Society the cause of the calamity: M. J. Becker, President Am. Soc. C. E.; James B. Francis, Past President Am. Soc. C. E.; William E. Worthen, Past President Am. Soc. C. E.; and A. Fteley, Vice-President Am. Soc. C. E.

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ANNUAL CONVENTION OF THE SOCIETY, HELD AT SEABRIGHT, N. J., JUNE 20TH-26TH, 1889.

FIRST SESSION, THURSDAY, JUNE 20TH, EVENING.—The Convention was called to order by the President of the Society, Mr. M. J. Becker.

The CHAIR.—The Secretary will please read the provisions of the By-Laws covering the Annual Convention.

The SECRETARY (read from Sec. 1 of the By-Laws).

I am requested to say, Mr. President, that it has been the custom to have the Chairman of the Convention nominated by the Local Committee.

CHARLES MACDONALD, M. Am. Soc. C. E.—Mr. President, in behalf of the members of the Local Committee, I have the honor and very great pleasure of welcoming you to Seabright. The local attractions of this part of the country are not very numerous; at the same time we hope that the Convention of 1889 may be a useful one and may be remembered with pleasure by those who are present.

In order that we may organize properly, under the rules of our Society, I take great pleasure in presenting the name of one whom I am sure you will all recognize as quite entitled to the honor of presiding over this body as Chairman. I wish to propose the name of Mr. J. J. R. Croes, who for ten years served as Treasurer of the Society, and who rendered very efficient and faithful service in that and in his other official relations to the Society, and whom I think we may honor on this occasion very appropriately as Chairman of the Convention.

The CHAIR.—It is moved and seconded that Mr. J. J. R. Croes preside over this Convention. (Mr. Croes was unanimously elected Chairman.)

At the request of the President, the past Presidents present, Mr. William J. McAlpine, Colonel Julius W. Adams, Messrs. James B. Francis, Frederick Graff and William E. Worthen, took positions upon the platform.

Mr. J. J. R. CROES (taking the chair).—Mr. President, ladies and gentlemen, I have to thank you for the high honor conferred upon me in calling me to preside over this Convention, and on behalf of the resident membership, I welcome the members from all parts of the country to New York. It is not often that that honor and pleasure is given to the members residing in New York, as for our Annual Conventions we have traveled all over all parts of the country, from Maine—not quite to California, although we some day hope to reach that point—from the North to the South, only occasionally meeting for professional improvement and social intercourse in New York City. The Annual Meetings are

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held in New York, but this is an entirely different occasion and no business is supposed to interfere with our pleasure.

In seeking for a place in which to hold the Convention in New York, the Committee, very wisely, I think, chose to come away from the bustle and distractions of a great city, where so many engineering works of interest are concentrated that they are likely to distract the attention of the members, and no better place could have been chosen than this, where, in the intervals of professional discussion, we can sit and look out upon the ocean, and possibly hear the faint echo of the greeting which our fellow members are receiving on the other side, and when we are tired of listening to the "multitudinous voice" of the waves we can devote ourselves to the problems which the committee have laid before us. There will be discussion on the question of the methods of transportation across streams, touching upon points in which foreign engineering features differ from American engineering methods. Then will follow discussions regarding water, treating first its most beneficent aspect as furnishing comfort and convenience by a public water supply, and then its terrible force and destructive power as an agent of harm, as exemplified in the Johnstown disaster. The methods of transportation by canals and by highways will follow, and last on the list, but not least important, are the discussions and papers regarding the great railway systems of the country, in which more engineers are engaged and more capital invested than in any other branch of public improvement. The discussions appear, according to the title of the papers, to lead in the right direction in one respect. The problem in the first part of this century has been to do the most work with the least amount of money; now the time has come when the wisest investment of the money is to be considered, by developing and strengthening and improving the railways in their tracks and in their rolling stock.

With these various attractions, without and within, I have to announce that the Convention is opened and the first order of business will be called for.

The SECRETARY.—Mr. President, I am requested to say that the committee in charge of arrangements of the papers and progress of their discussion announce that the printed preliminary programme, copies of which can be obtained in the Committee room, will be the programme of the meeting, unless the development of the discussions renders it desirable for the Committee at any time to make some changes, which will be duly announced.

I have just received, since coming to Seabright to-day, the following cable:

To BOGART, *Secretary American Society of Civil Engineers.*

American party left Dover at noon to-day. All well.

FORREST,
Secretary Institution of Civil Engineers.

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Mr. CHARLES B. BRUSH.—Mr. Chairman, we have all read with pleasure of the courtesies which have been extended to the party of American engineers now in Europe, and I move that this telegram be cabled to the Institution of Civil Engineers:

To the Institution of Civil Engineers, London, England:
The American Society of Civil Engineers, in annual convention assembled, desires to express its hearty appreciation of the courtesies extended to its members by your Institution and the English people generally.

JOHN BOGART,
(Carried.) *Secretary.*

NOTE.—Since the adjournment of the Convention the following letter has been received from Mr. James Forrest, Secretary of The Institution of Civil Engineers, London, England:

Your gratifying telegram of Saturday's date has been duly received.
I can assure you that all the members of this Institution and its officers have only been delighted to show their respect, esteem and regard for their American brethren.
Sincerely do we all trust that there may be other occasions of showing attention to American engineers, personally and collectively.
I am
Yours faithfully,
JAMES FORREST,
Secretary Institution of Civil Engineers.

SECOND SESSION, Friday, June 21st, Morning.—The session opened at 10 o'clock, Chairman J. James R. Croes presiding.

A paper on "American Railroad Bridges," by Theodore Cooper, M. Am. Soc. C. E, was read by the author, and discussed by Messrs. O. E. Michaelis, Seaman, J. E. Watkins, P. C. Ricketts, G. H. Thomson, T. Guilford Smith, William E. Hoyt and Theodore Cooper.

A discussion on "Timber Trestle Bridges," by C. Palmer, M. Am. Soc. C. E., was read by the Secretary.

A paper on "A Componential Truss for Traveling Cranes," by H. B. Seaman, M. Am. Soc. C. E., was read by the author.

THIRD SESSION, June 21st, Afternoon.—The session was resumed at 14.30 o'clock. The paper on "A Componential Truss for Traveling Cranes" was discussed by Messrs. Collingwood and Seaman.

A paper on the "Sibley Bridge," by O. Chanute, M. Am. Soc. C. E., W. H. Breithaupt, M. Am. Soc. C. E., and J. F. Wallace, M. Am. Soc. C. E., was read by the Secretary.

A paper on "Lime Sulphite Fiber Manufacture in the United States," by O. E. Michaelis, M. Am. Soc. C. E., with some remarks on the Chemistry of the Process, by Martin L. Griffin, M.A., was read by Major Michaelis and discussed by Mr. Collingwood.

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A paper on "The Development of the American Rail and Track," by J. E. Watkins, Assoc. Am. Soc. C. E., was read by the author.

FOURTH SESSION, June 21st, Evening.—The session was resumed Friday evening, June 21st. The President of the Society, Mr. Max J. Becker, delivered the Annual Address.

FIFTH SESSION, Saturday, June 22d, Morning.—The session of the Convention was resumed at 10 o'clock, Chairman J. J. R. Croes presiding.

A paper by George W. Rafter, M. Am. Soc. C. E., on "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," was presented by the author, and discussed by Messrs. Croes, Worthen, Francis, F. P. Stearns, Graff, Fteley, Brush, Whinery and S. L. Cooper.

By request, Mr. P. F. Brendlinger, M. Am. Soc. C. E., exhibited a photograph showing the process of injecting grout into the interstices of backing masonry in the New Croton Aqueduct, and explained the details of the process.

SIXTH SESSION, June 22d, Afternoon.—The session was resumed Saturday afternoon. Mr. A. Fteley, Vice-President Am. Soc. C. E., as acting Secretary of the committee appointed to visit the South Fork Dam, and to report to the Society the cause of its failure, presented a report of progress.

The subject was discussed by Messrs J. Foster Flagg, Collingwood, McAlpine, Macdonald, Becker, Brendlinger, John Bogart, James B. Francis, T. Spencer Miller, Fteley and Crowell.

Past President William J. McAlpine, Hon. M. Am. Soc. C. E., presented a paper on the "Construction of Dams." The subject was discussed by Messrs. Fteley, James B. Francis, Fargusson, Brendlinger, Croes, Becker and T. G. Smith.

A paper by Desmond Fitz Gerald, M. Am. Soc. C. E., on "Maximum Rates of Rainfall," was read by the Secretary.

SEVENTH SESSION, Monday, June 24th.—The session of the Convention was resumed at 14 o'clock, Chairman Croes presiding.

The CHAIR.—The first business is the appointment of a Nominating Committee. Under the provisions of the By-Laws, "At the Annual Convention a Nominating Committee of five members, not officers of the Society, shall be appointed by the Convention. This committee shall present to the Board of Direction, on or before the first day of November ensuing, the names of the persons selected by them as candidates for officers."

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This committee is to select the names of candidates for officers for the ensuing year, and report later.

It has been customary to nominate these five members from certain geographical districts. These districts were changed last year. As then arranged they were: No. 1. Resident members, New York City and fifty miles around; No. 2. The rest of New York, New England and Canada; No. 3. Pennsylvania and the South Atlantic States; No. 4. The Southern States, with Missouri, Kansas, Colorado and the Pacific slope; No. 5. The Ohio River States and the Northwest.

It is customary to take a recess for five minutes, in order that the members from these several districts may present the name of some candidate. What is the pleasure of the Convention?

Major O. E. MICHAELIS.—I move that we proceed with the order of business.

Mr. H. B. SEAMAN.—That includes the distribution the same as last year?

The CHAIR.—Yes, sir.

Mr. SEAMAN.—I second the motion.

The CHAIR.—The members present from these several districts will now please meet together and select nominations for members of the Nominating Committee.

Mr. WILLIAM P. SHINN.—Mr. Chairman, on behalf of the resident members, I am instructed to say that they have unanimously elected Mr. Stevenson Towle to represent their district.

The CHAIR.—The second district, the rest of New York, New England and Canada.

Mr. JAMES B. FRANCIS.—Have voted to nominate Major O. E. Michaelis.

The CHAIR.—The third district, Pennsylvania and the South Atlantic States.

Mr. M. J. BECKER.—That district has nominated Mr. F. H. Smith, of Baltimore.

The CHAIR.—The fourth district, the Southern States, with Missouri, Kansas and Colorado and the Pacific slope.

The SECRETARY.—Mr. President, I am instructed to say that one gentleman only is now here representing that district, and that quite a number of members have met together, and have suggested that this gentleman be the member of the Nominating Committee representing this district; that is Mr. Arthur Macy.

The CHAIR.—The fifth district, the Ohio River States and the Northwest.

Mr. A. N. TALBOT.—That district nominates Mr. J. F. Wallace, of Chicago.

The CHAIR.—The following nominations for members of the Nominating Committee have been made:

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Stevenson Towle, Major Michaelis, F. H. Smith, Arthur Macy and J. F. Wallace.

Mr. CHARLES B. BRUSH.—I move that these nominations be adopted as the choice of the Convention. (Vote put; carried.)

The CHAIR (Mr. Croes).—If there is no objection, the business meeting to be held during the Convention will be resumed, the Convention taking a recess until the conclusion of the business meeting, which is resumed after a recess.

EIGHTH SESSION, Tuesday, June 25th, Morning.—The session was resumed at 10 o'clock, Mr. M. Cohen in the chair.

A paper on the "Effect, of a Rapidly Increasing Supply of Water to a Stream, on the Flow Below the Point of Supply," by James B. Francis, Past President Am. Soc. C. E., was read by the author, and discussed by Messrs. Merriman, Eliot C. Clarke and James B. Francis.

The report of the Committee on the "Proper Relation to Each Other of the Sections of Railway Wheels and Rails" was then read.

A paper on "Cylindrical Wheels and Flat-Topped Rails for Railways," by D. J. Whittemore, Past President Am. Soc. C. E., was read by the Secretary. Written discussions by Messrs. Wilder, C. F. Allen, Burpee, Becker, J. D. Hawks, Blackwell, Waterman Stone, Pontzen, Le Rond, Buck, J. B. Johnson, Gottlieb, J. M. Goodwin, Wilson Crosby, E. T. D. Myers, W. Howard White, J. B. Francis, Crowell, Bouscaren, George Gibbs, Strobel, Bates, R. W. Hunt, Landreth, F. W. Webb, Collingwood, George S. Morison and C. P. Sandberg were read, and the subject was discussed by Messrs. Merriman and Fargusson.

A paper on "Punched and Reamed Steel" by Percival Roberts, Jr., M. Am. Soc. C. E., was read by the Secretary and discussed by Messrs. Skinner, Seaman, Merriman and Dagron.

The paper by Theodore Cooper, M. Am. Soc. C. E., on American Railroad Bridges, previously read, was discussed by Messrs. Flagg, Seaman and G. H. Thomson.

A communication from Professor O. H. Landreth on the subject of desirable methods for securing attention to improvement of highways was read. After discussion it was concluded that the subject was one belonging properly to the several States.

A paper on "The Influence of Temperature During Setting on the Tensile Strength of Cement Mortars, and on the Influence of Repeated Mixings on the Tensile Strength of Cement Mortars," by O. H. Landreth, M. Am. Soc. C. E., was read by the Secretary, and discussed by Messrs. Flagg, Seaman, Bogart, and Eliot C. Clarke.

NINTH SESSION, June 25th, Afternoon.—The session was resumed at 14.30 o'clock, Mr. M. Cohen in the chair.

A paper on "The Improvement of Railway and Street Railway

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Track," by E. E. Russell Tratman, Jun. Am. Soc. C. E., was read by the author, and discussed by Messrs. Flagg, Seaman, Voorhees, Thomson, Bryson and Cohen.

A paper on "Metal Track for Railways," by E. E. Russell Tratman, Jun. Am. Soc. C. E , was read by the author.

A paper on the "Settling and Filtration Basins of the Vicksburg Water Works," by Clarence Delafield, M. Am. Soc. C. E., was read by the Secretary and discussed by Mr. Flagg.

TENTH SESSION, June 25th, Evening.—The session was resumed at 20 o'clock, Chairman Croes presiding.

A paper on "Flood Heights in the Mississippi River, with Especial Reference to the Reach between Helena and Vicksburg," by William Starling, M. Am. Soc. C. E., was read.

The subject of the Improvement of Sedimentary Rivers was discussed by Mr. George H. Henshaw.

A paper on "Ship Canals in 1889," by R. E. Peary, M. Am. Soc. C. E., was read by the Secretary.

A paper on "Railways of Mexico," by W. Barclay Parsons, M. Am. Soc. C. E., was read by the author.

On motion of Mr. A. Fteley, the thanks of the Society were tendered to Mr. J. James R. Croes, the Chairman of the Convention.

On motion of Mr. M. Cohen, the thanks of the Society were tendered to the members of the Committee of Arrangements, Messrs. Charles Macdonald, T. C. Clarke and Stevenson Towle.

On motion of Mr. J. G. Dagron, the thanks of the Society were tendered to the Seabright Lawn Tennis and Cricket Club for their courtesy in extending the privileges of their club house and grounds to the Members of the Society during the Convention.

On motion of Mr. P. F. Brendlinger, the thanks of the Society were tendered to Mr. G. B. Sandt, the proprietor of The Octagon House, Seabright, at which the Convention was held.

The Convention then adjourned.

The following 134 members were in attendance at the Convention:

Julius L. Adams, Julius W. Adams, Brooklyn, N. Y.; Charles Ackenheil, Elizabeth, N. J.; W. H. Atwood, Cleveland, Ohio; Thomas W. Baldwin, Bangor, Me.; H. Bissell, Boston, Mass.; John W. Bacon, Danbury, Conn.; Peter F. Brendlinger, Tarrytown, Charles J. Bates, John Bogart, Alfred P. Boller, Alex. G. Brinckerhoff, H. Waller Brinckerhoff, Charles B. Brush, Andrew Bryson, C. W. Buchholz, New York City, Fred. H. Baldwin, Greenpoint, N. Y.; John A. Bensel, Jersey City, Charles P. Bonnett, Elizabeth, N. J.; Max J. Becker, Pittsburgh, Pa.; Charles R. Boyd, Wytheville, Va.; Eliot C. Clarke, Boston, Mass.; Samuel H. Chittenden, East River, Conn.; Alfred Craven,

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Dobbs Ferry, Samuel L. Cooper, Yonkers, Alfred G. Compton, Theodore Cooper, J. James R. Croes. New York City, N. Y.; Francis Collingwood, Elizabeth, N. J.; Charles T. Church, Saratoga Springs, J. Foster Crowell, Geneva, William B. Cogswell, Syracuse, N. Y.; Mendes Cohen, Baltimore, Md.; James G. Dagron, George Devin, S. L. F. Deyo, New York City, Clarence Delafield, New Brighton, N. Y.; Charles Davis, Pittsburgh, Pa.; Benjamin Douglas, Detroit, Mich.; Oscar Erlandsen, Portland, Pa.; Robert L. Engle, Cincinnati, Ohio; James B. Francis, Lowell, Mass.; Alphonse Fteley, New York City, Mark Fargusson, J. Foster Flagg, Brooklyn, Bryant Godwin, George S. Greene, Jr., New York City, Charles S. Gowen, Sing Sing, N. Y.; Frederick Graff, Philadelphia, Pa.; Edward B. Guthrie, Buffalo, N. Y.; R. L. Hoxie, Willets Point, Stephen S. Haight, Robert L. Harris, William J. Haskins, Rudolph Hering, John Houston, Charles W. Hunt, William R. Hutton, New York City, N. Y.; George W. Howell, Morristown, C. E. Hewitt, Trenton, N. J.; William E. Hoyt, Rochester, N. Y.; E. A. Hermann, Indianapolis, Ind.; J. M. Jackson, Easton, Md.; William H. Jennings, Columbus, Ohio; William D. Kelley, Jr., Tarrytown, C. H. Kelsey, New York City, S. Munch Kielland, Buffalo, N. Y.; William B. Knight, Kansas City, Mo.; James F. Lewis, New York City, Frank M. Leavitt, Brooklyn, N. Y.; J. I. Livingston, Bound Brook, N. J.; Gustav Lindenthal, Pittsburgh, Pa.; O. E. Michaelis, Augusta, Me.; T. H. McKenzie, Southington, Conn.; Charles Macdonald, Arthur Macy, Henry C. Meyer, George W. McNulty, New York City, William J. McAlpine, West New Brighton, N. Y.; T. Spencer Miller, Hackensack, N. J.; Foster Morss, Red Falls, S. B. McKee, Hancock, George E. Mann, Buffalo, N. Y.; Mansfield Merriman, Bethlehem, Pa.; Henry G. Morse, Edge Moor, Del.; Arthur L. Mills, Toledo, Ohio; Ellis B. Noyes, Fort Edward, N. Y.; John F. O'Rourke, Amherst, N. S.; Frederick N. Owen, New York City; J. E. Ostrander, Albany, N. Y.; Frank C. Osborn, Cleveland, Ohio; W. Barclay Parsons, Henry G. Prout, New York City, A. B. Paine, Poughkeepsie, George W. Rafter, Rochester, Benjamin Rhodes, Niagara Falls, N. Y.; R. E. Peary, League Island, Pa.; John A. Partridge, Washington, D. C.; Charles F. Powell, St. Louis, Mo.; Joseph R. Richards, Boston, Mass.; George S. Rice, Richard P. Rothwell, New York City; William Rumble, Bayonne, N. J.; Palmer C. Ricketts, Troy, N. Y.; Frederic P. Stearns, Boston, Mass.; William P. Shinn, Frank W. Skinner, Robert I. Sloan, Charles Sooysmith, D. McN. Stauffer, J. H. Striedinger, New York City, John M. Stewart, Dobbs Ferry, Merritt H. Smith, Jr., Yonkers, T. Guilford Smith, Buffalo, N. Y.; C. C. Schneider, Henry B. Seaman, Philadelphia, Pa.; Frederick H. Smith, Baltimore, Md.; Charles L. Strobel, Chicago, Ill.; George H. Thomson, Calvin Tomkins, Stevenson Towle, New York City, E. E. Russell Tratman, Brooklyn, N. Y.; A. N. Talbot, Champaign, Ill.; Jose R. Villalon, Theodore Voorhees, New York City; John

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D. Van Buren, Newburgh, H. L. Van Zile, Albany, N. Y.; N. J. Welton, Waterbury, Conn.; James R. Wardlaw, William E. Worthen, New York City, Albert L. Webster, West New Brighton, N. Y.; J. Elfreth Watkins, Washington, D. C.; Samuel Whinery and Frederick C. Weir, Cincinnati, Ohio.

Fifty-four ladies of the families of members accompanied them on the occasion of this Convention.

MEETINGS OF THE SOCIETY.

JUNE 24TH, 1889.—(Business Meeting during the Convention.)—M. J. Becker, President Am. Soc. C. E., in the Chair; John Bogart, Secretary.

The report of the Special Committee on the "Proper Relation to Each Other of the Sections of Railway Wheels and Rails" was presented. This report will be published, with discussions upon it, in the Transactions. The recommendations of the Report and its concluding paragraphs are as follows:

First.—Your Committee recommends a 12-inch top radius as a standard for rail sections of all weights.

Second.—Your Committee recommends a broad head relatively to depths for sections of all weights, taking care not to go too far in either dimension, especially in very large or very small sections, or to endanger the flange cutting into the joint.

Third.—Your Committee recommends a $\frac{1}{4}$-inch corner radius, as a standard for sections of all weights.

Fourth.—Your Committee recommends a $\frac{1}{16}$-inch lower corner radius for the head, as a standard for sections of all weights.

Fifth.—Your Committee recommends that, starting from a sufficient base width of head to give ample bearing for the joint, or to conform to recommendation No. 1, the sides be carried up vertical, as a standard for sections of all weights.

Sixth.—Your Committee announces as final conclusions the preliminary conclusions as to the general laws of rail and wheel wear included in its Preliminary Report.

Your Committee does not deem it proper to go beyond the above recommendations and attempt to elaborate details for standard sections complete. All that is included within the scope of its instructions it has now done. Anything beyond this must be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to "consider the proper relations to each other of the sections of railway wheels and rails." But the fact that such unexpected unanimity of opinion has developed in respect to the proper form of the head of a rail section encourages the Committee to believe that a moderate amount of intelligent effort would secure the adherence of three-quarters at least of the

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engineers and railway mileage of the country to a set of standard sections elaborated after due inquiry and comparison of views.

Your Committee, having discharged the duty intrusted to it, now asks to be discharged.

Respectfully submitted,

H. STANLEY GOODWIN,
A. M. WELLINGTON,
SAMUEL REA,
GEORGE S. MORISON,
THOMAS RODD,
S. M. FELTON, Jr.,
JAMES ARCHBALD,
Committee.

Mr. J. J. R. Croes moved that the report be received and the Committee discharged.

Mr. WILLIAM P. SHINN.—I move an amendment to the motion; that the motion of Mr. Croes be amended so as to read that the Committee be continued. (Seconded.)

Mr. SHINN.—I appear here under an obligation to represent a fellow member, Mr. Lindenthal, who was at the Convention during the preceding session. When I last saw him on Saturday, he asked if I would present his views on the subject of the continuance of this Committee, and the authorizing of it to recommend a set of standard rail sections. He gave me some communications which he desired me to present to the Convention, obtained by him. He states that the Cambria Company has thirty-three rail sections, ten of which are 60-pound rails, and eighteen of which are of sections above 56 and below 63 pounds in weight. The Pennsylvania Steel Company has twenty-four rail sections, five of which are 60 pounds and seven of which are above 56 and below 63 pounds. The Edgar Thompson Steel Company has thirty-two sections, of which four are 60, six are 56 and ten are above 56 and below 63 pounds. We all know how very slightly different sections are made to differ; most of us wrestle with the problem, and I do not hesitate to say that I have successfully done so myself during the last ten months and produced another rail section; but it will be a great advantage not only to the engineering profession, but to railroad companies and rail mills, if we could have a standard set of rail sections. We all recognize the fact that making and turning of rolls must be paid for out of the proceeds of the steel rails, and therefore by the railroad companies. We may shut our eyes and say we get rails at the same price whether we take a new or old section, but in point of fact if we had standard rail sections, we would get our rails somewhat cheaper. In competition we would get our rails cheaper. Then it would be another great advantage if we could have standard sections for rails for ordinary use which could be kept in stock. Now a rolling mill cannot keep rails in stock; they know that the particular section may be deviated from, and therefore be unacceptable; for that reason it seems to me that we should have a standard rail section.

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As to the question of the discharge of this committee and appointing another, or continuing this committee, it seems to me that engineers as well as others should proceed on the line of the least resistance. The members of this committee have made themselves familiar with the subject; they have collected an immense amount of information. If we are going to discharge this committee and appoint the same members on a new committee, it is a mere matter of form and we simply continue the committee.

The CHAIR.—The question is on the amendment of Mr. Shinn.

Mr. CROES.—Mr. President, has any gentleman present any argument to offer against the view taken by Mr. Shinn? I want to know if there is anybody who thinks differently; if there is not, I will accept his amendment.

Mr. ELIOT C. CLARKE.—It seems to me that it would be a little better to discharge the committee and re-appoint them, because I think the committee has a right to be discharged when they ask for it. When a committee is appointed and does the thing that is intrusted to it, and asks to be discharged, I think that they have the right to be discharged; then, if they are appointed again, they doubtless will accept and go on, but I think it is a little ungracious not to allow them that privilege when they wish it. I know I have been in that position myself sometimes.

Mr. CHARLES B. BRUSH.—As I understand it, this committee think they have exhausted the powers given them under the original resolution. Now, the mere resolution to continue it seems to me does not give the committee what they want. They want instructions which will give them the power to go on. If the committee is continued, it will have to be under a resolution giving them further powers, and therefore, the question is, whether it would not be well to discharge this committee and re-appoint it under a resolution which will give them fuller powers. If the original resolution is passed, there certainly ought to be a vote of thanks, and therefore I think the amendment would be undesirable. Any resolution which Mr. Shinn would bring up to cover the ground which they consider necessary I think would be proper.

Mr. SHINN.—I did not intend to speak again on this resolution. The matter of form is immaterial. It is clearly the sense of the meeting that this committee should be intrusted with the further work to be done. The committee have not only gone to the full extent of their instructions, but they have made recommendations which were not embodied in the original instructions, and it seems to me there is no injury in giving them fuller power and in continuing the committee. The motion offered by Mr. Croes was to accept the report and discharge the committee, my amendment was to accept the report and continue the committee; if that is adopted, I should move that the committee be authorized and instructed to report a standard rail section.

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The SECRETARY.—Mr. President, without desiring to interject parliamentary questions into the discussion, I beg to suggest that if this committee is discharged, then it is entirely possible that the appointment of a new committee is out of the power of this meeting, because it is provided by Section 23 of the By-Laws, that "Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: Any resolution proposing such a committee shall be referred to the Board of Direction, which shall examine the same and report to the Society a concise statement of the argument for and against the appointment of such committee, which statement shall be printed and issued to the Society with a letter-ballot; or, if the Board fails to report within one month, the letter-ballot shall be issued without comment." Now this committee upon sections of railway wheels and rails was appointed in the regular way; they have done their work with great care, and have finally made a report. In considering the relations between the sections of wheels and rails, they have really formulated a standard section of the upper portion of a railway rail, but they determined not to go farther than the Society authorized them to go. They secured the data to make a report upon the subject which was intrusted to them, and the committee now say, if the Society cares to have them continue, let it say so; at all events, here is the report.

The CHAIR.—Are you ready for the question?

Mr. M. COHEN.—It seems to me that if we simply accept the report of the committee without acting at all upon the question of their discharge, we accomplish the whole thing. If it be desirable that there should be intrusted to them the further duty of determining the form of section of rail as they may recommend it, it can be introduced here, and I suggest the proposition in this form: That the standing committee on the relation to each other of the sections of wheels and rails be asked to report upon a standard rail section. The standing committee, still in existence, will then deem it their duty so to report. I would, therefore, suggest to the mover of the last amendment that the motion be the acceptance of the report of the committee, and then it remains and is not discharged.

Mr. SHINN.—I accede.

Mr. COHEN.—If satisfactory, I make such a motion, that the report of the committee be accepted. (Accepted by Mr. Clarke, the seconder.)

The CHAIR.—Then the question is upon the amendment of Mr. Shinn to the effect that the report of the committee on rails and wheels be accepted. (Carried.)

Mr. SHINN.—I move that the committee be authorized and instructed to report to the Society a set of standard rail sections of weights beginning at 40 pounds and advancing up in increments of 5 pounds to 100 pounds per linear yard. (Seconded.)

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Mr. CROES.—Mr. President, I should think that that was not included in the scope of the original resolution. It is something entirely different from what the committee was called upon in the first place to report upon. The instructions to the committee, as authorized by a vote of the Society, were that the committee should consider and report to the Society on the proper relation to each other of the sections of railway wheels and rails; to what extent and at what points it is expedient that their sections should be such as to bring them normally in contact, and to what extent and at what points it is not expedient that they should be so in contact; and that the committee be instructed to seek information from all those who are known to have given the subject attention. It may be that that could be stretched so as to cover the whole question, but it does not sound so to me.

Mr. A. FTELEY.—It seems to me that it does not require any stretch of the imagination at all to deem that the first desideratum in solving the question is to determine what are actually the best sections of rails. It seems to me that it is decidedly included in the general question, and that the point taken by Mr. Croes is not well taken.

Mr. CROES.—I should be very glad to see a section recommended by the committee. I only thought, that definite instructions having been given, the committee have reported; that if the committee was instructed to do something entirely different and to go beyond their duties, those who differed from the conclusions of the committee might raise the question with regard to the propriety and legality, that might affect them in the future.

Mr. BRUSH.—The principle put forth by Mr. Croes is an important one. When a resolution specifies facts, the sense of the resolution ought to be carried out by the committee. The question is whether this resolution of Mr. Shinn's is not included in the original resolution. This is a question upon which I want to call upon the chair to give his opinion.

Mr. COHEN.—Mr. President, I would move this further resolution: *Resolved*, That the Board of Direction be requested to consider the advisability of intrusting to the committee the further duty of reporting to the Society a standard set of rail sections; if it appears to them proper to do so, to so intrust that duty to the committee.

Mr. BRUSH.—Now the effect of that resolution would be to delay any action until a letter-ballot has been sent out. I have asked your opinion as to whether the resolution of Mr. Shinn is in order; one member says it is and another says it is not.

Major O. E. MICHAELIS.—I can see that the Society has no right to do by indirection that which the Constitution forbids directly. Of course, we cannot assign new duties to an old committee to do away with the more complicated way of appointing a new committee, but I do think the members here have this right: I think the majority of those

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present can express their views and such views are binding, because if the other members differ, they ought to be here to express those differing views; those present, I think, are competent to discharge the committee, and their views ought to be acceded to by members who are not here—otherwise we would never reach a conclusion.

The CHAIR.—It seems to me that it would be far more satisfactory if the members of the Society should decide whether the motion of Mr. Shinn is not already included in the formal resolution under which the committee acted, than to leave it to the presiding officer to arbitrarily decide the question. I think the meeting is far more competent to decide that question. If a motion is made to the effect that the question ought to be decided by the Society at large, then it would settle the question.

Major MICHAELIS.—If Mr. Shinn's motion is put and a majority vote in favor of it, that decides the question so far as those here are concerned.

Mr. BRUSH.—The point I wish to make is that we all agree that it is desirable to appoint that committee; we all agree that it is desirable to get a report of that committee on standard rails. If the chairman of the Society rules that the motion of Mr. Shinn can be fairly included in the original resolution and no objection is made to the ruling of the President, why then we would not be placed under conditions where we would be criticised; we would not be acting in violation of the Constitution. On the other hand, if his ruling was dissented from and sustained, then it would be considered as having been passed by the Society.

Mr. CROES.—And have it appear upon the minutes that it was considered at a meeting of the Society, by being put to vote, one way or the other; so that in future we would have something to fall back upon.

The CHAIR.—It appears to me that the committee having already, in making their report, declared that their duties had been accomplished and asked to be discharged, evidently upon a full deliberation of their delegated powers, and upon reading the resolution itself, it appears to me that the powers of the committee have really been exhausted and that we could not again charge them with the execution of additional duties in connection with this matter. Is there any dissent from this ruling?

Mr. SHINN.—I accept the ruling.

Mr. COHEN.—Mr. President, the ruling of the Chair having been given, it would appear that there was but one thing to do, and that is, if it be desirable to intrust this committee with new duties, that a resolution to that effect should be offered here, and, if carried, the Board can consider whether it is advisable that these duties should be intrusted to them and a letter-ballot be sent out. If it be really

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so beneficial that this committee, which has given so much time and careful thought and study to the subject, should now formulate a set of standards, the fact that it takes an additional month to notify them of that duty is a very unimportant matter. Therefore I would renew the resolution which I read a moment ago, and, if it is seconded, I think it would cover the desired action.

Mr. CROES.—Mr. President, I believe that there is a motion before the house that the report of the committee be received and the committee be discharged with the thanks of the Society for the valuable work which they have done.

Mr. COHEN.—I think the motion which was made, that the report of the committee be accepted, was proposed before that motion was carried. The committee has not been discharged, and I would move that before the committee is discharged this resolution be considered by the Society.

Mr. CROES.—I think that the discharge of the committee will come first; the committee ask to be discharged; I move that the committee be discharged with the thanks of the Society for the valuable work which they have done. (Seconded.)

Major MICHAELIS.—It seems to me that this is the only course to pursue under the President's decision; it only remains for us to discharge them with thanks.

The CHAIR.—Gentlemen, you have heard the motion of Mr. Croes to the effect that the committee be discharged with the thanks of the Society.

Mr. COHEN.—Mr. President, before putting the motion I would like to say, it seems to me that the same power which gave to that committee, not yet discharged, certain duties to perform, can give it certain other additional duties, and if it be desirable to retain the same committee, there is no reason why that additional function should not be given to them now, with the approval of the Board. That is the only reason why I shall vote no on the discharge of the committee.

Mr. CROES.—The vote cannot be taken on that to-day.

Mr. COHEN.—Through the regular form. The committee appear to intimate that there are certain functions which should be performed by them if the Society direct; it does not appear to me advisable to discharge them and go through the form of appointing them over again.

Mr. CROES.—Has the gentleman read the last part of the committee's report, that they have exhausted their authority and ask that another committee should be appointed?

The SECRETARY.—There is nothing said about another committee: "All that is included within the scope of its instructions it has now done. Anything beyond this must be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to 'consider the proper relations to each other of the sections of railway wheels and rails.'" It does not necessarily mean another committee.

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Mr. CROES.—(Read from the report as follows): "Anything beyond this must be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to 'consider the proper relations to each other of the sections of railway wheels and rails.'"

The SECRETARY.—Now as I understand Mr. Cohen's motion, it is to expressly appoint this present committee to do this work, if the Society chooses to do so.

Mr. COHEN.—It can only be done under the rules of the Society. I believe this resolution was offered before the motion was made to discharge the committee. It will be for the Chair to decide what was in order.

The CHAIR.—There is no resolution before the meeting asking for the discharge of the committee, and no such motion has been carried; the motion was that the report of the committee be accepted, and it was definitely stated that the committee should not be considered discharged; it would seem to me, therefore, that Section 23 would not apply in this case, since the committee is still in function. They certainly could be instructed with additional duties by the Board.

Major MICHAELIS.—Mr. President, I must beg to differ from that view of the case; the Board cannot have more power in instructing committees, than the power that elects the Board.

The CHAIR.—The Board will simply act in accordance with instructions from the Society. If it receives instructions from the Society to the effect that this committee be further instructed to report on standard rail sections, the Board will do so.

Major MICHAELIS.—That was Mr. Shinn's motion, and the motion was declared to be out of order; the question was submitted to the Chair and the Chair decided that that was unconstitutional. The Constitution provides the methods for appointing committees and is silent in regard to methods of relegating new duties to old committees. I see no other course but to discharge this committee.

Mr. H. B. SEAMAN.—Isn't this a mere technical action? We can retain this committee just as well as we can give it new power.

Mr. COHEN.—If the gentleman will let me read the resolution, I think it will cover the whole thing: "*Resolved*, That the Board of Direction be requested to consider the advisability of intrusting to the committee the further duty of reporting to the Society a standard set of rail sections, and if it appears to them proper to do so, to intrust that duty to the committee."

Major MICHAELIS.—Will Mr. Cohen read that portion of the By-Laws under which he proposes this to be done?

(Section 23 was read.)

Major MICHAELIS.—Is that the only section of the By-Laws that refers to this matter? If so, the only thing that can be considered by the Board is the appointment of a special committee, not the question of giving further instructions to an old committee.

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Mr. CROWELL.—I think the solution would be this: That a resolution be offered, naming the members of the old committee as the individuals who will constitute the new committee, and then let it take the same course that it would have taken if the present committee had not been in existence. We can pass a vote of thanks to the committee and discharge them, and if we do this, the first action is taken in proposing them for a new committee.

Mr. FTELEY.—There is now before the meeting a motion to that very effect, a resolution to discharge the committee with thanks.

Mr. T. GUILFORD SMITH.—No one seems to question the power of this meeting to accept the report and discharge the committee. Now if we have got power to discharge them, why not the power to continue them?

The CHAIR.—Because the By-Laws contain a provision for cases of that kind.

Mr. BRUSH.—I really don't see how this committee can take up a new function without a letter-ballot; you are adding a scope of work which will be entirely outside of the original resolution; the By-Laws require that the question of any work of this kind shall be submitted to the Society by a letter-ballot. The devising of a standard set of rail sections is an entirely new scope of work, and the authority for any such work must be governed by letter-ballot; besides, it seems to me it would be a dangerous precedent to establish that the Society could direct the appointment of a committee for a piece of work that might be unimportant, and then that the scope of work of this committee should be enlarged beyond anything that was originally intended. I think whatever is done should be done slowly and should carry the weight of the Society. When this committee makes this report, and the report which they make is one that is going to be of immense importance to the profession and to the railroad companies, it should carry with it all the weight that it possibly can carry, and if there is anything that even looks like technicality, it should be done away with. The whole weight of this Society will be carried in this matter, and it is desirable that this should come before the Society by letter-ballot, and in that view of the case it would be exceedingly desirable if Mr. Cohen should withdraw his motion and the committee be discharged with thanks, and another committee can be appointed by the Board of Direction, after they have sent out a letter-ballot, and the committee can go on.

Mr. COHEN.—I withdraw the resolution, sir; I see that under the present ruling of the Chair that is the only proper course.

Mr. SHINN.—I recognize the ruling of the Chair and a careful reading of the By-Laws has convinced me that my motion was out of order. I recognize the point that Mr. Brush has made as proper. I make a motion that the vote passed amending Mr. Croes' resolution be reconsidered and that will put us back on the original resolution. (Seconded.)

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The CHAIR.—It is moved and seconded that the first resolution as passed, accepting the report of the committee, be reconsidered. (Carried.)

Mr. CROES.—I make my motion: *Resolved*, That the report of the committee upon the proper relation to each other of the sections of railway wheels and rails be received, and that the committee be discharged with the thanks of the Society for the very valuable work which they have done. (Vote put and carried.)

Now, Mr. President, I think that if Mr. Cohen would offer his resolution naming the persons to be appointed upon this committee, the Society is prepared to receive it.

The SECRETARY.—The proper resolution is that a committee be appointed who shall report for the consideration of the Society the forms of standard sections of rails, giving the details as Mr. Shinn has done, and I suggest that it is not desirable that we should, in sending out a letter-ballot, complicate it with the names of that committee; that the Board of Direction appoint that committee. There may be some members of that committee who cannot serve. The Board of Direction will appoint upon the committee all the members of the old committee, probably, who may be willing to serve again. I suggest that the resolution be for a special committee to report for the consideration of the Society a standard section of rails, then giving the details of it as Mr. Shinn did in his motion, such committee to be appointed by the Board of Direction. If this is offered here and seconded, then it goes immediately to the Board of Direction, which reports upon the expediency of it if it chooses and sends it out within a month to letter-ballot, and I would not complicate it with names. I am making this merely as a suggestion.

Mr. SHINN.—I make the motion in the form suggested by Mr. Bogart. (Seconded.)

The CHAIR.—It is moved and seconded that a committee to be appointed by the Board of Direction should be authorized and instructed to report to the Society a set of standard rail sections of weights beginning at 40 pounds and advancing by increments of 5 pounds to 100 pounds per linear yard.

This was carried. Under the provisions of the By-Laws it goes to the Board for letter-ballot.

The SECRETARY.—The next business in order would be the report of the Standing Committee on Uniform Standard Time.

Mr. SHINN.—Mr. President, I am again called upon to act in a representative capacity. The chairman of the Committee on Standard Time, Mr. Sandford Fleming, has written me this letter, which suggests a certain line of action by the Society.

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OTTAWA, June 7th, 1889.

WILLIAM P. SHINN, Esq.,
Director Am. Soc. C. E.

DEAR SIR,—I had a letter from Dr. Egleston a short time back in which he mentioned having seen you, and to some extent discussed with you the question of time notation, which is being considered by the Special Committee Am. Soc. C. E., of which I am chairman. I believe you sympathize with our views and efforts, and you were good enough to say to Dr. Egleston that I might write to you on the subject whenever I felt that a practical turn could be given to our efforts, and that if any man would or could, Dr. Egleston believed you would very materially help forward the movement.

The present stage of the movement is to get the 24-hour notation generally adopted. To accomplish this, we aim at two things: 1st. To educate the public mind up to the change by keeping the idea constantly before the community. 2d. To secure the co-operation of the railway companies as soon as practicable. These two-fold objects, we think, can be promoted at the same time and they will mutually advance each other. A great deal of correspondence has passed between members of the committee since the annual meeting in January last as to the best means of effecting these objects and the carrying into effect a resolution of the Society "that further efforts be made to secure the adoption of the new notation." About ten months ago the following members of the committee unanimously agreed on the course to be followed: Messrs. Charles Paine, Theodore N. Ely, J. M. Toucey, Dr. Egleston, Professor Hilgard, Sandford Fleming.

The committee, after much deliberation, decided that the best course is to issue for general information the report presented at the last annual meeting of the Society, together with a full list of railway men and others in favor of the 24-hour notation; to send this out with a circular inviting an expression of opinion. I inclose a copy of the form of circular unanimously agreed on.

The report* and the list of persons favorable to the new system has been printed in pamphlet form, and I have just received from Mr. Bogart a few advance copies, one of which I inclose. I have not as yet seen a printed copy of the circular and reply, recommended by the committee to be issued, but I hope they will be ready before long and that they will be widely circulated.

It is on this point more especially that I take the liberty of writing you. The opinion is very strong with me that at this particular stage we want an expression from as wide a circle of railway men as possible, and this will depend on the number of copies issued and the means taken to bring them to the notice of railway men of standing. I am quite aware that many busy men will send no replies, but others will, and all will be more or less informed on the present condition of the movement by sending to them these papers, and will be thereby the more ready to acquiesce in the adoption of the new notation. If we can thus establish that there is a general feeling in favor of the change throughout the country, and especially among railway men, Mr. Toucey's idea can then be acted on, and if thought advisable, the Government asked to authorize the change.

The only difficulty which I can see is to bring the printed papers to the notice of all the principal railway men in the country. There are

* See Proceedings for January, 1889 p. 30.

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about four hundred separate corporations, and to send copies to but four of the principal officers would involve addressing 1 600 envelopes. It might, however, be possible to reach most of them by addressing the Secretary of each company, sending each a few copies, and by inviting him to be obliging enough to bring them to the notice of the chief officers of his company most likely to give attention to them. If this be done, the clerical work in Mr. Bogart's office would be very much reduced. In fact, it would be limited to sending out some four hundred addressed envelopes each inclosing, say, from three to five copies of report, with, say, half a dozen copies of Circular A (replies attached) and a single lithographed or type-written circular to Secretaries of railway companies.

In addition to this, it would be highly proper to send one copy of report and circular (with form of reply) to each member of the American Society of Civil Engineers.

I have troubled you at considerable length. My excuse is my earnest desire to do my duty as Chairman of the Special Committee. I trust as a member of the Board of Direction you will see your way to urge the immediate carrying out of the recommendations of the Committee or the adoption of some other course equally well calculated to accomplish the desired end.

Believe me,

Dear Mr. SHINN,

Yours very truly,

SANDFORD FLEMING.

Mr. SHINN.—For the purpose of bringing it before the meeting, I move that the Board of Direction be authorized and requested to send out not to exceed 2 000 copies of the last report of the Special Committee on Uniform Standard Time, at the expense of the Society, in addition to the number required to supply the members. (Carried.)

The SECRETARY.—We have no other reports from committees.

The CHAIR.—Unfinished business is next in order. None being now presented, new business is next in order.

Mr. COHEN.—Mr. President, it may not be known to all the members of this Society that there has been established by the Smithsonian Institution in the National Museum, at Washington, a department for the preservation of objects of interest relating to the history of engineering in this country. They have done a great deal of work in that direction. Mr. J. F. Watkins, Assoc. Am. Soc. C. E., the Curator of the Museum, presented with the paper he has read many objects of the greatest interest to engineers, including original sections of many early rails. Very much has been done towards establishing the nucleus of a very interesting collection at the Museum, and I think this project should be of active interest to the engineering profession throughout the country. In that view, I would offer the following preamble and resolution:

Whereas, The authorities of the Smithsonian Institution have established in the National Museum, at Washington, a department devoted to the preservation of the history of American engineering science;

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Resolved, That the American Society of Civil Engineers hereby expresses its gratification at the establishment by the Smithsonian Institution, with the authority of the general Government, of a department in the National Museum for the preservation of objects of interest bearing upon the history of American engineering, and recommends that American engineers co-operate with the Smithsonian Institution in furthering the objects for which the Department of Engineering has been established:

Resolved, That copies of this resolution be sent to the Secretary of the Smithsonian Institution and to the Curator of the Engineering Department of the National Museum.

(Seconded. Carried.)

Mr. H. B. SEAMAN.—I was just about to bring forward a new subject. At the Kaaterskill Convention there was a motion laid upon the table—the appointment of a committee upon bridge specifications; that was laid upon the table, to be taken up at some future time. I think that motion involves a very complicated, a very important subject, the theory of bridge specifications. There is, however, a portion of bridge specifications which are almost uniform, and yet not near enough so to be satisfactory—that portion relating to the material and workmanship of railroad bridges. It is not necessary to dwell upon the value of a uniform specification. The manufacturers have shown us their appreciation of that value by devoting a great deal of time and labor to devising their specifications. There is no specification in the country to-day, among engineers, which carries with it the weight that the manufacturers' specifications carry. It is for such a specification, drawn up with equal care by a body of professional men, that I would offer this resolution:

Resolved, That a committee of seven members of this Society be appointed by the Board of Direction to devise and report a uniform specification for the material and workmanship of railroad bridges. And that the committee be requested to make a preliminary report, subject to discussion, at a meeting of the Society previous to its final report.

I move that this resolution be referred to the Board of Direction, with a request for its determination, according to By-Law 23, of the issue to letter-ballot. (Seconded.)

Mr. ELIOT C. CLARKE.—Do I understand that "railroad bridges" covers all bridges, wooden and iron?

Mr. SEAMAN.—The object was to include iron and steel; the material of wooden bridges, with the exception of the iron, is small.

Mr. CLARKE.—As drawn?

Mr. SEAMAN.—No, this states railroad bridges; perhaps I had better make it read so as to include iron and steel as well.

Mr. CROES.—As drawn it would cover the specifications for masonry bridges also.

I should think we might as well amend that resolution by appointing a committee of seventeen to draw specifications on all subjects, complete specifications for public work.

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I would amend the resolution by making it seventeen members to draw complete specifications for public works.

Mr. F. COLLINGWOOD.—I agree with Mr. Croes. Years ago we had this subject up before us and there was a strong effort made to make a uniform specification. I think that a committee could only go part way with such a specification, and by the time we got a set of standard specifications we would all be gray. I don't agree at all with the idea that we, as members, want to be tied down to the specifications of a committee; we each one want to do that for ourselves very largely.

Mr. SEAMAN.—I would like to ask Mr. Collingwood if we have not had a committee appointed on uniform tests of cement?

Mr. COLLINGWOOD. — That is a totally different matter; those are experiments. I agree entirely with the idea of testing; that is a matter which involves a large amount of work, there is a vast amount of labor to be done; there is every reason why there should be uniformity in methods of testing, but when we come to specifications that is a very different thing; when we come to say that we shall try to do work exactly by a sure rule, that is another matter.

Mr. F. W. SKINNER.—I agree with Mr. Collingwood. I think that whereas the value of specifications and their consideration is of importance, the time is not ripe for making general standard specifications, nor do we as a body wish to assume the responsibility of it. We have now a couple of specifications, which go into great detail and which give a very excellent starting point for individual designers. I think no engineer who is capable of making a large structure wishes to be tied down to a certain specification. The adoption of such specifications, which would be difficult to secure, would hamper more than help us. There is a great deal of progress yet to be made before we are ready for it. I think, as regards the workmanship, that can hardly be made a very fruitful source of standard specifications; things of this sort cannot be covered by a body; there are always questions which go back to the Chief Engineer for settlement. Different forms of construction require such different material that an attempt to cover them all would do more harm than good. Manufacturers' specifications have done some good, but they are prepared from the manufacturer's standpoint.

The matter of tests is very opportune to the question. From the cement tests we have experienced a great deal of good; the requiring a uniformity of methods of testing would work to great advantage; but as regards general specifications, it seems to me the matter stands very well as it is.

Mr. SHINN.—The matter of standards is one that we want to be very careful about using and not abusing. It is a very valuable thing to have standards in those things which are produced by tens and hundreds of thousands, but not in those things which are produced by tens or hundreds. When we adopt a standard we stop improvement in that direction,

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and the tendency of standards in railroad machinery has already shown this to some extent. It strikes me, not being a bridge constructor myself, that it would be unwise to attempt to set up a standard of specifications in material and workmanship of bridges. The case that the mover of the resolution suggests, that we appointed a committee which reported upon standard tests of cement, is not *apropos*. The question then was that we should adopt the language in which we could report the result of our test. The results were not expressed in the same language previously. In methods of test it is important that we should have standards, but we should be careful not to set up standards in such delicate matters as bridge construction.

Mr. SEAMAN.—I would like to say that the remarks of Mr. Shinn apply directly to the tests on materials. There is information to be sought in this direction, and it can only be sought by a committee of this kind. In regard to the remarks of Mr. Collingwood, it seems to me that they directly conflict. Mr. Skinner mentions that we haven't enough information on which to work. Mr. Collingwood mentions that we have all the information and don't need the committee.

Mr. COLLINGWOOD.—We haven't got enough information yet for national standards of steel construction, but we are working up to it.

Mr. SEAMAN.—I would like to state this: there is no word standard in that motion; simply that we obtain more information and uniform information on this subject.

Mr. C. C. SCHNEIDER.—Mr. Seaman wants a committee that will recommend a uniform specification, not enforce it upon the Society—recommend it, that is all—of material and workmanship.

Mr. SEAMAN.—There is nothing compulsory.

Mr. SKINNER.—Is it intended to provide a standard in that matter?

Mr. SEAMAN.—No, sir; simply an investigation; such an investigation would always be a matter of authority, as it should be.

Mr. SHINN.—I would like to point out the fact, as the report of the committee on tests of cement has been brought up, that it is a matter of history that the committee on tests of cement made a report in which they not only reported in regard to the manner in which tests should be made, but they undertook to report a standard of cements, and it was the sense of the Society that that was a subject on which they were not desired to report at that time, and if the mover of this resolution had made it a resolution to devise a uniform method of testing of iron and metals used in bridge construction, it would be something like the Committee on Tests of Cement; but when such a committee as he asks is suggested, the scope of the resolution is very much wider, and recommends their reporting a standard specification as to material and workmanship.

Mr. SEAMAN.—I would like to say that I first had the resolution made out in this way: To devise and report a uniform system of tests of

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material and workmanship of railroad bridges; but our experience of this morning taught me that we had better not restrict our committees too much. They will be composed of representative members of the body, and they will restrict themselves according to their judgment.

The CHAIR.—The question now is, to refer the motion to the Board of Direction, with a recommendation for its adoption according to By-Law 23 for issue by letter-ballot.

Mr. BRUSH.—I am going to present a somewhat similar resolution on another subject, and, therefore, I can speak very freely. I don't think this Convention ought to pass such a resolution. Our Society is composed of some twelve hundred members, and here we are about one hundred in this room. I think that the design of that By-Law is that when any such resolution is referred to the Board of Direction, the Board of Direction should prepare a concise statement of the arguments for and against, and it then should be sent out to the sober, quiet judgment of all our members. I don't think they should be hampered by the resolution here to-day. I think that these resolutions should be subjected to the criticism and quiet consideration of our members by letter-ballot, and should be simply sent out with such arguments for and against them as the Board of Direction think proper to do. All that ought to be done, is simply to refer it to the Board of Direction without any recommendations. I think it is unfair for this business meeting of the Society to make any recommendation to the Board.

Mr. SEAMAN.—The understanding is that the recommendation was not to the Board, but to the Society. The Board, as I understand it, can act or can refuse to act; that the meeting recommends the resolution. That is not a recommendation to the Board.

Mr. CROES.—The Board of Direction has no discretion in the matter, so far as issuing the letter-ballot is concerned; this whole meeting could not change the duty of the Board; they have got to present the arguments for and against.

We had a great deal of trouble with this very sort of thing, of determinations by a small number of members of the Society assembled together, and there was a complaint made that they were having committees appointed favoring local interests, and this By-Law was drawn so that a resolution goes unhampered by any restriction to the Board of Direction, who present the arguments concisely, for and against its adoption, and send it out to the Society; or they send it out without comment. I think the arguments would be pretty much one-sided myself, but that is their business. Let every man have a chance to vote upon it.

Mr. SEAMAN.—In regard to Mr. Croes' objection, I would like to say that I have copied this almost verbatim from the previous motion as to our Committee on Tests of Cement.

Mr. CROES.—Almost verbatim covers a great deal of ground.

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Mr. SEAMAN.—You can refer to the Proceedings.

Mr. COLLINGWOOD.—Are we to understand that if a dozen such resolutions should be offered here, this meeting can say nothing at all about it, but they must all be sent out for the consideration of the Society? I suppose that if this meeting voted down a resolution it was not to be referred to the Society.

Mr. CROES.—I do not think you can limit the offering of resolutions. Every man here might offer a resolution.

Mr. COHEN.—I rise to a point of order. If I rise and offer a resolution here and the resolution is voted down, it becomes null. I cannot rise and say I want to offer a resolution that there shall be a special committee appointed for some particular thing, and when the Convention calls it nonsense and votes it down, it shall be considered by the Board; that certainly cannot be intended. A resolution is not a resolution because I write it out upon a scrap of paper.

May I read, sir? (Read Section 23 of the By-Laws.)

A slip of paper which I may prepare and send in to the Board of Direction is not a resolution; a resolution is something that has been passed at a meeting of the Society. If we should adopt the resolution that Mr. Seaman has offered, that is submitted to the Board; and if that is voted down, that ends it.

The SECRETARY.—Mr. President, it has been ruled previously when such resolutions proposing special committees to report on engineering subjects have been offered that a meeting of the Society could not vote on such resolution; that it must be referred to the Board of Direction and then passed upon by letter-ballot. If members of the Society in full standing choose to offer a resolution and get some other member to second it, I do not see under our present By-Laws how we are going to help taking a letter-ballot. A meeting can, of course, determine the sense of that meeting in favor of or against such resolution.

Mr. SHINN.—I think if that ruling has been made it is nearly time it was reversed; if we have got any bad law let us turn it into a good law. A resolution is not a paper offered by somebody and seconded by somebody; that is a motion. It begins with the word "resolved;" now we do not resolve until we do resolve. I think the plain meaning of this By-Law is that when the Society at any of its meetings resolves that such a committee shall be appointed, the By-Law recognizes that that meeting does not consist of the whole body of members, and that the rest of the members have a right to be heard; therefore, it seems to me that it is time that the present incumbent of the Chair reversed this previous ruling, and I don't believe that this meeting will reverse him if he does find that a resolution is not a resolution until it is adopted. If this By-Law had meant otherwise, it would have said the proposition, or someting of that sort, for the appointment of a committee;

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if it intended that any member could send in at any time a proposition to have a committee appointed, it would have used different language. But in using the language employed, a "resolution proposing" means after it shall have been adopted.

Mr. CROES.—I differ entirely from the gentleman. I know something about the adoption of that By-Law and its preparation. I think I wrote that sentence, "Any resolution proposing such a committee," and I wrote it carefully and advisedly. It meant just what it said. The precedent which the gentleman seeks to establish here is one of the most dangerous ones which could possibly be established. It brings up this whole question of a central society, and its members scattered all over the country. If ten or fifteen members at a meeting might vote down a proposition made in good faith by a number of members, by members perhaps away from the regular place of meeting of the Society, we would have it said that this little set of members assumed to dictate to the whole Society just what they should do, and it was for that very reason that this by-law was adopted; and, I maintain, with all due deference to Mr. Shinn, that the meeting is right, and that the Chair is right, and that every man has a right to a vote; that the motion or resolution, call it whatever you like, should come before the whole Society. And if the Board of Direction does its duty it will present a short statement of arguments; and, as Mr. Bogart has suggested, it is very well to put in that statement of arguments that at the meeting of the Society forty-eight or forty-nine members voted against or voted for it. But we must put it before the whole Society in the form in which it was presented.

Major MICHAELIS.—I would like to ask the gentleman who has just spoken, why were business meetings at all provided for? What is the function of a business meeting? We never have more than forty or fifty members at a meeting, and that same rule, if carried, would apply to all resolutions.

Mr. SEAMAN.—I would like to indorse that. I think this is the meeting that should refer this to the Board of Direction. I would not like individually to do it through the meeting; I think we have got to pass it by a vote.

The SECRETARY.—In answer to Major Michaelis' point; this is a special clause in the By-Laws referring to a certain kind of resolution. It does not say that all resolutions, but only a resolution proposing a special committee.

Major MICHAELIS.—I understand that.

The SECRETARY.—We are discussing the law, not the merits of the law. As Mr. Croes has touched the point, not so much was that amendment to the By-Laws proposed and adopted with the idea of preventing a small meeting of the Society from appointing committees, as with the idea of preventing a small meeting of the Society from having the veto

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power over the great majority, and, if you notice the very last clause of the By-Law, that idea is fully carried out; the Board of Direction have not got a veto power upon it; if the Board of Direction does not choose to say anything in favor of or against the resolution the Society can act on it nevertheless. The Secretary's duty is to send it out, and if the Board of Direction does not act within a month the Society has a right to vote. It is a question whether that By-Law should give the veto power to twenty or twenty-five members upon a proposition to appoint a committee on an engineering subject. If the technical point raised by Mr. Shinn is true, then certainly the twenty-five men have a veto power over any resolution proposing to appoint a committee on an engineering subject.

Mr. SHINN.—That seems to me at first sight to be conclusive. It has been decided over and over again by the courts that laws must be considered by the plain meaning of their language and not by the intention of the persons who use that language. I have a distinct recollection myself of having written an amendment in regard to the manner in which the Constitution should be amended, and the meaning which I intended to convey was decided not to be conveyed, and that amendment had to be again amended in order to carry out the intention which I had in my mind. It seems to me that Mr. Croes and the Secretary are both overestimating the bad effect that would arise if the construction is put on this language that I put. I do not think that ordinary meetings of the Society will refuse to let the appointment of a committee go out, if there is reasonable ground for its going out; and if one meeting does so refuse, there is nothing which prevents the same proposition being brought up at some other meeting; but even if there were, it seems to me the plain meaning of the language used in this by-law should be adhered to, and I cannot too strongly impress upon the members the idea which I have that a resolution is not a resolution until it is adopted; it is merely a motion. If Mr. Croes, in writing this, had intended that a proposition should be referred to the Board of Direction, that would have been plain enough, but in this case it says a resolution in the By-Law. There is as yet no resolution, there has been a motion made that a resolution be adopted.

Major MICHAELIS.—I remember a precedent now that bears very closely on this case. I remember at one of our conventions, during the convention a committee which reported progress, was discharged by a simple vote of the business meeting at the convention. Now if a business meeting had the power by a majority vote to discharge a committee which has not completed its work, it certainly must have this power. That was the Committee on Tests of Material, which was discharged at the Montreal Convention.

The CHAIR.—Upon the mere reading of the By-Laws I first felt inclined to side with the views taken by Mr. Cohen and Mr. Shinn.

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More particular reading would seem to indicate that the meeting has no power at all to act in the matter, would play no part whatever, and that under any condition any members presenting a resolution of this character would have the right that it should be referred to the Board. Now it would seem that if action must be taken by letter-ballot, what is the object of having such a resolution brought before the meeting when the meeting cannot do anything whatever finally in the matter?

There is a great deal of force in the interpretation given by Mr. Croes, and I can readily see that a ruling giving a meeting power over such a proposition would establish a precedent which I think would be far more dangerous than if the opposite course was taken, and if now called upon to rule, I would rule adversely to the views of Mr. Cohen and Mr. Shinn; but at the same time I believe that the proper measure to be taken, which Mr. Bogart suggested, is to take the sense of the members present by a vote, and let the Board of Direction incorporate that in the communication addressed to the members with the letter-ballot, so that they may be informed of the sense of the meeting.

Major MICHAELIS.—I think such a view might be under some circumstances destructive of the Society, because there might be in existence five or six members in good standing who might not have the best interests of the Society at heart, and they might swamp the Board of Direction with resolutions which the Board would be obliged to send out, and these five or six members might bankrupt the Society.

I move that it is the sense of this meeting, that the word "resolution," in Section 23, means a resolution that has been passed by a majority of the members present at the business meeting.

Mr. CROES.—I hope that Major Michaelis' resolution will not pass in the present shape. I do not know that this little meeting is called upon to express an opinion upon a constitutional point in the By-Laws in that way. It does not carry any weight with it and it would create a very bad feeling.

Mr. COHEN.—It may be reversed at any other meeting. It is a great deal better to do it by an amendment to the By-Laws.

Mr. FTELEY.—It seems to me that the motion made by Major Michaelis is a disguised appeal against the ruling of the Chair. If it be so, let us say so; if the gentleman wants to say that he wants to appeal from the ruling of the Chair.

Major MICHAELIS.—I do not think the Chair has made any decision.

Mr. SHINN.—I think the proper way is to simply appeal from the decision of the Chair.

Major MICHAELIS.—I did not understand that the Chair had made any ruling, or I should have appealed from such decision. I do think the members of the Society who come from all over the United States to a business meeting of the Convention must certainly have some rights. If you are going to decide that the members who come to the Conven-

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tion have no rights, then you will have no business meetings at all. Under these circumstances, sir, I do appeal from the decision of the Chair.

Mr. BRUSH.—I simply want to say one thing: that the idea that this question affects the general business meetings, it seems to me is entirely wrong; it simply affects the appointment of standing committees on an engineering subject. The question we are considering is the important one of the appointment of standing committees, and the Society has felt for years that it was a very important thing, and one in which it should go slowly. I think the ruling of the President is right; it is one of the things in regard to which the Society should hold to certain rules.

Major MICHAELIS.—I must have been exceedingly unhappy in my choice of language. The question that I raised does concern the general business meeting of the Society. I raise this point: that by a vote, a business meeting of the Society has a right to prevent, by its action, ruinous expense to the Society. This meeting should have and must have, and I believe has the right as such to prevent such proceedings.

Mr. COLLINGWOOD.—The feeling that I have is rather averse to that expressed by Mr. Croes in offering this resolution. I confess to being somewhat conservative. I do not want to see every subject brought up before the Society as a whole. I know that when a resolution comes up before the Society, the chances are that unless it be positively bad, it will be carried. Those who are interested in it will push it, possibly against the better interests of the Society. I have no objection especially against this proposed action except this: this thing has been up at least once before, and it was voted down. It was in a meeting exactly like this that it was voted down. If the resolution proposed a committee to report upon a method of making tests of material for bridges I should have been in favor of it; but I do not like it in this shape. I think, however, that in a meeting of this sort, which is composed of representative men from all parts of the country, we would be quite as apt to get an honest expression of opinion by a vote upon such a resolution as this, as if it were submitted to a letter-ballot.

Mr. SEAMAN.—It was not my intention in introducing this resolution to create any dissension. It has created a great deal more discussion than there was any thought of, but rather than this should be the cause of any dissension I will withdraw the resolution.

Major MICHAELIS.—I withdraw the appeal.

Mr. BRUSH.—I offer the following resolution:

Whereas, It is a well-known fact that many cities and towns on the Atlantic coast have suffered very greatly from impurities in their water supplies due to various causes, and that no adequate remedy, meeting all conditions, has been found therefor; and

Whereas, These impurities are often due to natural causes, which have not been adequately investigated on account of the difficulty of

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centralizing the individual efforts of all parties engaged in said investigations;

Resolved, That a committee of three members of this Society be appointed by the President to ascertain the best means of concentrating all obtainable information in such a manner as to secure useful results, and to report to the annual meeting of this Society what further action in their opinion should be taken in the premises.

Seconded by Mr. Cohen.

Mr. COHEN.—I was greatly impressed by the remarks made by Mr. Brush yesterday, and it has been within my own observation in several cases that we have had these troubles with our city water supplies. We have not been able to ascertain the causes, and the causes assigned are so different at different times and in different localities, that I think something of that sort is very desirable. I am a resident of the city of Baltimore, where we have, I believe, the finest water supply in the country. It is a very abundant supply; the mains are not very large, and, therefore, the flow of water through the mains is likely to be in very active motion, and as the water in the reservoirs is, I believe, frequently changed, it does not become stagnant. The water is introduced into the reservoirs through jets, and is aërated to a greater or less extent, and yet we have there quite frequently this problem of offensiveness. I left Baltimore a few days ago, and I noticed the fact in passing one of the fountains that an offensive odor was very perceptible. We have had an unusual quantity of rain and I do not think the water is likely to be stagnant just now, and yet this thing was very evidently occurring. The cause assigned is this little microscopical animal or plant. I think we have very much still to learn concerning these microscopical plants or animals and that this information can only be collated by some intelligent committee who are devoted to the subject, and I hope the resolution may be adopted.

Mr. SHINN.—I would like to call the attention of the members to the fact that Mr. Brush was instructed by a unanimous vote of the Board of Direction to present the matter in this way to the Convention, and I sincerely hope that the resolution which he proposes will pass unanimously. This is not offered to establish a standard of pure water, but simply an effort to ascertain the condition of the water, and whether any element in it is dangerous to life. It is a matter in which the co-operation of engineers and chemists is readily obtainable, and it is important that such action as Mr. Brush proposes should be taken in order to establish a body that could be appealed to in such matters.

Mr. CROES.—This resolution comes under By-Law 23. It gives me an opportunity to offer the resolution which I intended to offer with regard to the other one. This resolution goes to the Board of Direction. Under the rules it is perfectly proper that this meeting express an opinion that it is desirable that such a committee be appointed, and I make this motion:

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Resolved, That it is the sense of this meeting that the committee named in the resolution offered by Mr. Brush should be appointed.

That will give an expression of the opinion of this meeting upon it, and it would go out to the Society with that indorsement for all that is worth. (Seconded.)

The CHAIR.—The motion of Mr. Croes is before you, that this meeting express by a vote their approbation or dissent in regard to the resolution which is offered by Mr. Brush, which motion is referred to the Board of Direction for further action under Section 23 of the By-Laws.

The motion was carried.

Mr. SHINN.—It seems to be my fortune or misfortune to be called upon in a representative capacity. Some members of the Society who are not here to-day requested me to present a subject at this meeting. The correspondence upon this subject began nearly a year ago. I was invited by these gentlemen to join them in an effort to bring about the proposed action, and suggested that the better time and place was at the Annual Convention. It is on the subject of the systematic amendment of the Constitution. The Constitution, as the gentlemen are aware, is a thing of shreds and patches, amended from time to time by adding here and taking off there, so that now it is somewhat disconnected and unsatisfactory. There is a feeling of unrest among a large section of our members, particularly our Western members, in regard to the Constitution.

Whether it is justified or not, I am not expressing an opinion. Previous experience has shown that it is wiser to take cognizance of such feelings than it is to ignore them. I therefore offer these resolutions on the subject of the systematic amendment of the Constitution:

Resolved, That a committee of seven members of this Society be appointed by the President to consider and report upon a systematic revision of the Constitution and By-Laws, so as to afford the Society the best basis for its continued growth and an increased measure of usefulness.

Resolved, That all members having suggestions to make upon the subjects referred to the committee, or amendments to offer to the Constitution or By-Laws, be requested to send the same to the chairman of the committee.

Resolved, That the committee, if it decide to recommend any amendments to the Constitution or By-Laws, be instructed to present the same, together with the views of the committee upon the same, in the manner and within the time provided for offering such amendments.

Resolved, That the Board of Direction be requested to have the report of the committee printed and distributed to the members, with the proposed amendments.

Resolved, That the committee be authorized to confer with any committees appointed for the purpose, by the local engineering societies, with a view of determining whether a satisfactory basis can be established for affiliating therewith.

Resolved, That the committee make a final report at the next Annual Meeting.

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In offering these resolutions, I do not wish to confine the committee to any particular form of amendment to the Constitution. All the members, I presume, have received, as I have, a copy of the proposed amendments issued by the Cincinnati members. I have in my possession a copy of some of the proposed amendments prepared by some of the Missouri members. I promised two or three of those members who intended to present them at this meeting, that I would present the subject for them in this way. It seemed to me wise that if the Constitution is to be materially amended, it should be done by a committee appointed for the purpose; that they should consider all the amendments that might be offered, and that they should so formulate an amendment to the Constitution, that it should not be at variance with itself, as our Constitution has been found to be at times.

As to the suggestions that are made of the power to be given to the committee to confer with representatives of local societies, that was specially requested by the persons who asked me to present the matter. There seems to be some reason for considering the subject at this time. The Board of Direction has, I have reason to know, more or less trouble to get a sufficient number of papers to present to the Society, and to keep its transactions up to the high standard that they have heretofore borne. Some of us know that one cause of this is that a member who belongs to a local society and can read his paper before forty or fifty of his friends, prefers to do so rather than to send it to the Secretary at New York and have it read before forty or fifty members of the Society there. The life of a society of this kind depends upon the number and character of its papers, and unless these papers and transactions interest the profession, we cannot hope to go on and increase both in numbers and usefulness as we have done. It is for the purpose of getting that matter before the meeting that I offer that resolution.

Mr. CROWELL.—I second the resolution. I desire to say that I also am a representative of some of the members of the Society from Cincinnati. Mr. Whinery proposed to do this, and, in his absence, requested me, not knowing of Mr. Shinn's intention to propose a committee, to bring to the attention of the Society as a body the formal views which the Cincinnati members had adopted. As most of the members have probably seen the form of the amendments proposed by the Cincinnati members, it is unnecessary for me, in seconding Mr. Shinn's motion, to read them; but I will merely say that the Cincinnati members have given so much attention to the matter, that their views are entitled to be considered by the committee as such, and I think that in their estimation that would be the best way to bring them before the Society, so I simply offer their views in seconding the motion.

Mr. BRUSH.—The very important subject that has been presented will, of course, receive consideration and discussion among us. It is now half an hour after the time for our regular adjournment so I move

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that when we adjourn, we adjourn to meet at 14 o'clock, and the first business which we take up be the election of a Nominating Committee, and then take up this business immediately afterwards. I think we had better begin with the appointment of a Nominating Committee and let the consideration of this subject immediately follow.

Mr. CROES.—I beg to suggest to the gentlemen that it be a recess.

Mr. BRUSH.—I now move that we take a recess to 2 o'clock, and the first business be the appointment of the Nominating Committee.

The SECRETARY.—I rise to a point of order. You are so strictly technical to-day that I shall have to call your attention to Section 24 of the By-Laws, which provides that "At the Annual Convention a Nominating Committee shall be appointed by the Convention." This is a business meeting of the Society and not a session of the Convention.

Mr. BRUSH.—I withdraw it all; I move we take a recess.

The CHAIR.—This meeting will take a recess until 2 o'clock.

The SECRETARY.—Fourteen o'clock.

BUSINESS MEETING, AFTERNOON SESSION.—The business meeting of the Society took a recess until after the session of the Convention.

(The Convention met and appointed the Nominating Committee. See page 66.)

The business meeting was then resumed, President Becker in the chair.

The SECRETARY.—We were considering, sir, the question of the appointment of a committee of seven members to consider the revision of the Constitution.

The CHAIR.—Are there any remarks on that subject?

The SECRETARY.—I am requested, Mr. President, to read the resolutions.

The Secretary read the resolutions, as above.

Mr. President, I am requested to present the following discussion by Mr. A. M. Wellington, who is unavoidably absent:

Mr. A. M. WELLINGTON.—"As professional engagements compel me to be absent from this Convention, I submit the following suggestions as to the proposed amended form of the Constitution, which has been submitted by the Cincinnati Association of Members of the American Society of Civil Engineers.

"In my judgment, some action of the kind, to remedy defects which time has developed, is urgently needed, although I was not aware that any such action was contemplated. Many of the proposed changes seem to me eminently judicious, but others of questionable propriety, while certain desirable changes are not touched upon at all in the draft. The proposed changes, as they stand, however, amount practically to a new Constitution; and they ought to do so, as the old form has been so tinkered in detail as to be ill arranged and needlessly verbose, as well as imperfect in substance.

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"Any such radical change ought not to be adopted hastily, nor without previously consulting the entire membership, by circular, as to the separate parts of the instrument. Such a course is much more likely to result in a finally acceptable form than if any committee attempt to elaborate a form, acting on their own judgment alone.

"I would suggest the appointment of a committee of not over seven, and not too scattered in residence, so that they may be able to get a quorum together, who should take up the articles of the Constitution relating to the following eight heads separately; submit amended forms for them tentatively to the membership, and after digesting the responses sent in, draft a final form for submission in the constitutional manner. All the articles of the Constitution may be classified under the following eight heads:

1. Name and purpose of the Society.
2. Membership, Grades, and Qualifications, and Privileges thereof.
3. Election, Transfer and Expulsion of Members.
4. Number, Qualifications and Elections of Officers.
5. Duties of Officers and Committees.
6. Dues and Payment thereof.
7. Stated and Special Meetings.
8. Amendments.

"By elaborating the articles under these heads separately, and perfecting them one by one to the satisfaction of a majority of the membership before proceeding to another, there can be no doubt that agreement would be secured. By drafting a whole Constitution for formal submission without so consulting the membership, there is less chance of acceptance of the Committee work, and much less chance of the most judicious action. The Committee on the Form of Rails and Wheels has found this method of consultation by circular to work exceedingly well, easily leading up to agreement, where before there was chaos.

"I believe the practical end sought would be best attained by appointing a committee of seven, consisting exclusively of members residing within 100 miles of some one city; which it would not matter, as the consultation by circular would eliminate all local tendency; but in order to make the committee still more representative, it might be appointed by a general vote, striking names from a list of say twenty nominees."

The CHAIR.—Any further discussion?

Mr. BRUSH.—The resolution before the meeting is the resolution of Mr. Shinn.

Mr. A. FTELEY.—Mr. Wellington does not present any motion, he simply states his ideas. The paper before us is Mr. Shinn's motion, but there are several divisions of that motion, and I suggest that we shall take them one by one, and discuss them.

The CHAIR.—The resolution consists of six parts.

Mr. MENDES COHEN.—It occurred to me, Mr. President, that Mr. Shinn's resolution called for a committee to which should be referred the consideration of all this detail. I am afraid that in this comparatively small meeting we could scarcely discuss amendments to the Con-

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stitution with much profit, and, if this committee be appointed, if the resolution be carried by the Society in this meeting, the proposed amendments, either from the gentlemen from Cincinnati or from other sources, will be laid before that committee—if the Convention directs the appointment of such a committee—and will be carefully considered and put in proper form. It seems to me that it would be unadvisable for us to go into a discussion of these various proposed amendments at the present time.

The SECRETARY.—Mr. Shinn offers six different resolutions. Mr. Fteley suggests that those resolutions be taken up one after the other.

Mr. FTELEY.—The Secretary says just what I meant. I know perfectly well that we are not going to undertake to make any changes in the Constitution now; but there are certain ideas which might be discussed.

The SECRETARY read the first resolution of Mr. Shinn, as follows:

Resolved, That a committee of seven members of this Society be appointed by the President to consider and report upon a systematic revision of the Constitution and By-Laws, so as to afford the Society the best basis for its continued growth and an increased measure of usefulness.

Mr. COHEN.—What is the next?

(The Secretary read the second resolution.)

Mr. SHINN.—I see no objection to following the method proposed by Mr. Fteley, that the resolutions be taken up one by one and voted upon.

Mr. FTELEY.—It seems to me that is the proper way.

Mr. COHEN.—Then, sir, I second the first resolution, for the purpose of bringing it up.

(The Secretary again read the first resolution, as above.)

The CHAIR.—Any remarks on this first part of the resolution? If there is no further discussion we will vote on it.

(Vote taken. Carried.)

The second resolution reads:

Resolved, That all members having suggestions to make upon the subjects referred to the committee, or amendments to offer to the Constitution or By-Laws, be requested to send the same to the Chairman of the Committee.

Mr. J. J. R. CROES.—Is that motion seconded?

A MEMBER.—I second it.

Mr. CROES.—That seems to me entirely superfluous; I should think the committee would attend to that; it simply burdens the minutes uselessly. The first resolution is comprehensive in scope.

Mr. SHINN.—I do not agree with Mr. Croes about that. Under our fundamental law any member may submit an amendment to the Constitution, and the object of specially appointing this committee is so that instead of amendments coming in from a dozen or a hundred different sources, they will all come in through one source. It is merely a request

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on the part of this meeting that members shall send their suggestions to the Committee, instead of submitting them directly.

Mr. CROES.—If the gentleman will amend it so that all proposed amendments to the Constitution, submitted before the first of November, be referred to this Committee, it would be proper.

Mr. SHINN.—I do not think we can constitutionally do that. Under the Constitution we cannot deprive any member of his right to send in his amendment in the regular way; all we can do is to make the request.

Mr. FTELEY.—It seems to me that the powers given to that committee are so great that it is not necessary that a resolution be passed to empower them to do certain things. It seems to me that this proposed resolution might be embodied in certain instructions given by the Convention to this committee. It is very proper that when a committee is appointed it should be instructed to do certain things, and in that case the resolution might be made to cover the point more properly.

Mr. J. F. CROWELL.—It seems to me that this action might obviate some difficulty and it might lessen the labor of the committee in advance.

Question called for. The Chair read the second resolution. Vote taken. Carried.

The Chair read the third resolution, as follows:

Resolved, That the committee, if it decide to recommend any amendments to the Constitution or By-Laws, be instructed to present the same, together with the views of the committee upon the same, in the manner and within the time provided for offering such amendments.

Mr. SHINN.—That is as to amendments to the Constitution.

The SECRETARY.—Amendments to the By-Laws may come up at any time. That is so as to insure the possibility, if the committee act, of getting these voted upon within the next year.

Question called for; resolution seconded; vote taken. Carried.

The Chair read the fourth resolution, as follows:

Resolved, That the Board of Direction be requested to have the report of the committee printed and distributed to the members with the proposed amendments.

(Seconded. Carried.)

The Chair read the fifth resolution, as follows:

Resolved, That the committee be authorized to confer with any committees appointed for the purpose by the local engineering societies, with a view of determining whether a satisfactory basis can be established for affiliating therewith.

(Seconded.)

Mr. SHINN.—The object of that resolution is that, if there is to be any such affiliation, it must be provided for in the Constitution, and there is a very decided feeling in many quarters that there ought to be some basis of recognition, on the part of the Society, of the local societies. I do not undertake to advocate the idea of affiliation at this time,

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nor, of course, to discuss it. This resolution is simply intended so that the committee may be in a position to provide, in the proposed amendments to the Constitution, for such affiliation, if it is thought desirable and proper.

(Vote taken. Carried.)

The Chair read the sixth resolution, as follows:

Resolved, That the committee make a final report at the next Annual Meeting.

(Seconded; vote taken. Carried.)

Mr. J. G. DAGRON.—I would like to bring up the matter brought up by Mr. Seaman this morning, in a different shape. I would propose the following resolution:

Resolved, That a committee of seven members of this Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures, and to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

There is no doubt there is considerable difference in the methods employed in testing materials used in metallic structures and that these results would be much more valuable if arrived at by certain standard methods of obtaining them. Such recommendations would not be in the nature of a standard specification, but would be, more strictly speaking, recommendations as to what, in the judgment of the committee, would constitute good materials.

(Seconded.)

The CHAIR.—It might be well for the meeting to consider whether the resolution offered by Mr. Dagron comes under the meaning of Section 23, which you have heard read several times, and the clause which I think would be proper to consider is as to whether this can be considered with propriety an engineering subject.

Mr. SHINN.—Will the Chairman rule upon that subject?

The CHAIR.—I have my own views about it, but I would like to have the matter discussed by the members. Unless it is an engineering subject no special committee should be appointed for carrying out the measures proposed in the resolution.

Mr. COHEN.—Mr. President, that resolution calls for a committee to investigate a subject that I suppose appeals to the views and probably to the endorsement of almost every member of the Society; but, under the restrictions which we have already had presented to us in reference to such committees, I do not see how they can be appointed without reference to the By-Law. I shall be prepared to vote, when the time comes, on the adoption of that resolution, but I am inclined to think that we cannot get the committee appointed without just the same formality that has been discussed this morning.

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The CHAIR.—We are trying to obtain the views of the Society for the guidance of the Board.

Mr. COHEN.—It seems to me that this is under the same restriction of By-Law 23.

Mr. SEAMAN.—I think the only thing for this meeting to do is to refer this to the Board of Direction. I do not see that we have any other alternative.

The CHAIR.—The resolution will be referred to the Board.

Mr. COHEN.—Mr. President, will it be in order, in view of the resolution recently passed, to appoint a committee on the revision of the Constitution, to introduce an amendment of By-Law 23 now? Would such an amendment take effect at an earlier date than amendments to the Constitution and By-Laws as proposed? If so, if we can bring about some modified working of the by-law, I would offer an amendment which I have prepared.

(The Secretary read from the By-Laws, Section 26.)

Mr. COHEN.—That would carry it over to September or October.

The SECRETARY.—That would carry it over to September, at least.

A MEMBER.—Then it would be subject to revision by the general committee.

Mr. COHEN.—It is hardly worth while.

Mr. CROES.—Is it the desire of the mover of that paper in reference to materials for structures to have an expression of opinion made by this meeting with regard to the propriety of making it a resolution? As was done in the other case, that it is the sense of this meeting that it is proper that such a committee should be appointed; that it was unanimously recommended by this meeting.

Mr. SHINN.—It is certainly within the power of any member to offer a motion of that kind, to be confirmed into a resolution.

Mr. CROES.—I move that in the opinion of this meeting the appointment of such a committee is desirable.

The SECRETARY.—That is, the committee proposed by Mr. Dagron's resolution?

Mr. CROES.—Yes, sir.

Mr. SHINN.—As the question of the desirability of the appointment of the committee is now up for discussion, it seems to me that it would be much more desirable if the proposition contained in Mr. Dagron's submission of a paper could be divided into two. There is, if I recollect the language of it, first a proposition that a committee should be appointed to consider and recommend a uniform system of testing materials for metallic structures, and then there is another and distinct proposition that they shall recommend specifications or qualifications of such metals. Now, those are entirely dissimilar propositions, and if they could be so arranged by the author or architect or designer of the paper in question that a vote could be taken upon them separately, it is

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quite possible that the first might be adopted and the second be rejected.

Mr. DAGRON.—I have no objection to the matter being put into shape and made two resolutions, if desirable.

The SECRETARY.—Not two resolutions.

Mr. DAGRON.—No, two propositions. I do not think that the recommendations contemplated would be any more in the nature of specifications than the recommendations of any other committee appointed by the Society as to what would be a desirable form for an engineering feature; for instance, for a rail or anything of that kind. It is simply the expression of the views of the committee.

Mr. JOHN BOGART.—In that connection exactly I must say that the experience of the results of the work of the committee to formulate a standard method of testing cement has shown that it was of very great benefit to the profession. I know, from the very large number of engineers, all over the country and in Canada also, who have written to the Secretary for a copy of the Methods of Testing Cement, saying in their letters that they desired to adopt them for their work, that this has been of the greatest benefit. The work of the committee was merely the formulating a method of testing. As Mr. Shinn recalled to us, that committee did suggest standard strengths. That was stricken out, and I think the fact that it was stricken out has made the work of the committee enormously more useful to us than if it had been left in.

The briquettes that are made now conform so almost entirely to the form recommended by the committee that having, a few weeks ago, five briquettes made in the old form, I had great difficulty in getting machines which would test them. Finally I sent a man up to Troy and he found a couple of old clips in which he tested these briquettes.

But the standard strengths which were suggested by that committee are not the standard strengths of to-day.

Mr. DAGRON.—I have no objection to dividing the resolution as proposed.

Mr. SEAMAN.—Do I understand that is another resolution?

Mr. F. COLLINGWOOD.—Some years ago some of our best engineers were very fixed in their idea that this Society should adopt a fixed standard of weights which should be recommended as the weights for bridges. To-day I think those weights are just about double. We cannot do that in this Society; we must not adopt standards. We have to-day more certain knowledge respecting steel than we had then, and yet any one who reads the Transactions of the Institute of Mining Engineers cannot help seeing that some of the brightest minds of the country are working on that problem, and that we are going to have different conditions from what we have to-day, and the standards we might adopt to-day might be entirely wrong.

The SECRETARY.—The author of the proposed resolution suggests this modification:

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Resolved, That a committee of seven members of this Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures.

Resolved, That the same committee be requested to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

Mr. SHINN.—I would suggest to the author that a vote be taken separately on the two resolutions, by letter-ballot.

Mr. CROES.—I move that this meeting recommend the adoption of this first motion.

Mr. SEAMAN.—It seems to me that this is an unnecessary step.

Mr. SHINN.—It is what we have always done.

Mr. SEAMAN.—It is what you refused to do this morning.

Mr. CROES.—The question now is on the adoption of the motion I offered. (Seconded.)

The CHAIR.—Any remarks on Mr. Croes' resolution?

Mr. SEAMAN.—I do not understand just how we are better able now to vote upon that question than we shall be by ballot, and how we, as a small meeting here, are able to advise those who are not present any more than we were this morning.

(Question called for. Carried.)

The SECRETARY read the second part of Mr. Dagron's motion as above.

Mr. COLLINGWOOD.—I move that the sense of this meeting be that this resolution be not adopted. (Seconded.)

The CHAIR.—It is moved and seconded of the part just now read, that the sense of this meeting be opposed to the adoption of that part of the resolution.

Mr. CROES.—I call for a count on that question.

The CHAIR.—On both resolutions?

Mr. CROES.—The first was carried.

The CHAIR.—The first was unanimous.

Rising vote taken. Nineteen in favor of the motion (against adopting the resolution); one opposed.

Mr. C. C. SCHNEIDER asked for information. The Secretary read the resolution and explained the matter to Mr. Schneider, who then wished to be counted in the negative. Two opposed.

The SECRETARY.—There are thirty-four members present.

The CHAIR.—Twenty-one have voted, at least thirteen not voting.

The SECRETARY (to the Stenographer).—Make the record nineteen in the affirmative, two in the negative, and thirteen present and not voting.

The CHAIR.—Any further business?

Mr. SEAMAN.—I think this is doing just what Mr. Croes said this morning the By-Laws were made to avoid. It is an expression of opinion by this meeting which is going to kill a motion.

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Mr. COLLINGWOOD.—That is just what we wanted to do.

Mr. SEAMAN.—I understood that provision was made in the By-Laws in order to avoid an action of just this kind.

Mr. CROES.—Not to avoid an expression of opinion, but to avoid the killing of a motion by a few men.

The CHAIR.—Any further business?

On motion, the business meeting of the Society, held during the Convention, adjourned to July 3d, for the purpose of then canvassing the current ballot for membership.

The session of the Convention was resumed, Mr. J. J. R. Croes taking the chair again.

The SECRETARY asked whether it was the desire of the members present that presentation and discussion of papers should proceed this afternoon, or whether they wished an adjournment to visit the Long Branch Water Works.

Mr. BRUSH.—I think it would be far better that we should adjourn until to-morrow morning at 10 o'clock.

On motion, the Convention adjourned to June 25th, at 10 o'clock.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Election.
GAY, MARTIN	(Elected Junior, June 4, 1884.) Assistant Engineer Dept. Public Works, City of New York, West New Brighton, Richmond Co., N. Y.	June 5, 1889
HALL, JULIEN ASTIN	First Assistant Engineer Richmond and Danville R. R., Washington, D. C.	June 5, 1889
NEARING, FRANK	Brown, Howard & Co., Tarrytown, N. Y.	June 5, 1889
PIERSON, GEORGE SPENCER	Kalamazoo, Mich.	June 5, 1889
STARR, ARTHUR BURR	Superintendent Eastern Div. Pennsylvania R. R., Allegheny, Pa.	June 5, 1889

ASSOCIATES.

BREUCHAUD, JULES	204 West One Hundred and Twenty-first st., New York City	June 5, 1889

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FUTAMI, KIOSABURO.....Keith and Perry Building, Kansas City, Mo..... June 5, 1889

HAZEN, JOHN VOSE.....Dartmouth College, Hanover, N. H. ..... June 5, 1889

HUNSIKER, MILLARD .....Carbon Iron Co., Pittsburgh, Pa..... ..... June 5, 1889

JUNIORS.

CUSHING, WILLIAM CHANNING..Engineer Maintenance of Way, Cincinnati and Muskingum Valley Ry., Zanesville, Ohio. June 5, 1889

LAWLOR, THOMAS FRANCIS.....Resident Engineer Eastern and Western Approach, Poughkeepsie Bridge, Poughkeepsie, N. Y..... June 5, 1889

SMITH, MERRITT HAVILAND, JR.Assistant Engineer Croton Aqueduct, P. O. Box 767, Yonkers, N. Y..... June 5, 1889

CHANGES AND CORRECTIONS.

MEMBERS.

ANNAN, CHARLES L.....Assistant City Engineer, St. Paul, Minn.

COWLES, WALTER L.....Engineer Youngstown Bridge Co., Youngstown, Ohio.

FLAD, EDWARD.....Civil and Mechanical Engineer, Laclede Building, St. Louis, Mo.

GERBER, EMIL.....With George S. Morison, The Rookery, Chicago, Ill.

HERING, RUDOLPH .....277 Pearl st., New York City.

HOAG, SIDNEY W., JR.....1718 Madison ave., New York City.

HUNT, RANDELL .....Chief Engineer San Francisco Contracting Co., 1001 Pine st., San Francisco, Cal.

JACKSON, JONES M.....Chief Engineer for Godeffroy & How, Contractors Baltimore and Eastern Shore R. R., Easton, Md.

ROBINSON, ALBERT F.....(Care E. L. Corthell), 205 La Salle st., Chicago, Ill.

RUSSELL, NATHANIEL E.....580 First ave., Lansingburgh, N. Y.

WALKER, WILLIAM W.....General Manager Tucson, Globe and Northern R. R., 11 Wall st., New York City.

WASHBURN, FRANK S.....143 Forty-seventh st., Chicago, Ill.

WETHERILL, WILLIAM C.....General Manager Empire Zinc Co., Joplin, Mo.

ASSOCIATE.

BARNES, WILLIAM H.....President and Receiver Allegheny Valley R. R., 234 South Fourth st., Philadelphia, Pa.

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JUNIORS.

BELL, GILBERT J..... .....Sibley, Mo.
HAINES, GASPAR W.....Cheltenham, Pa.
HORTON, SANDFORD .....(Care Y. N. and S. W. Ry.), Yankton, South Dak.
MOULTHROP, GEORGE E.....(Ray & Moulthrop), Butte, Mont.

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MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JULY 3D, 1889.—At an adjourned session of the meeting of June 24th, held at New York, July 3d, 1889, ballots were canvassed and the following candidates declared elected. As Members: Waldo Emerson Buck, Lake Village, N. H.; William Howard Courtenay, Montgomery, Ala.; Rob Benjamin Davis, Pencoyd, Pa.; Louis Hyde Evans, Chicago, Ill.; Joachim Godtske Giaver, Pittsburgh, Pa.; Edward Gillette, Jr., New Haven, Conn.; Paul Sourin King, New York City; William Rufus Northway, Chicago, Ill.; Samuel Harrison Smith, San Francisco, Cal.; Benjamin Thompson, Chattanooga, Tenn. As Associates: Julius I. Livingston, Bound Brook, N.J.; Thomas Spencer Miller, New York City. As Juniors: Norman Smith Latham, Brooklyn, N. Y.; Ludwig Paul Wolfel, Pencoyd, Pa.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
COURTENAY, WILLIAM HOWARD	Assistant Engineer Southern Division L. and N. R. R., Montgomery, Ala	July 3, 1889
DAVIS, ROBERT BENJAMIN	Manager Bridge and Construction Department Pencoyd Iron Works, Pencoyd, Pa	July 3, 1889
EVANS, LOUIS HYDE	Division Engineer Chicago and Northwestern R. R., Chicago, Ill	July 3, 1889
GILLETTE, EDWARD, Jr.	123 Columbus Avenue, New Haven, Conn	July 3, 1889
KING, PAUL SOURIN	Chief Engineer Buffalo and Geneva R. R., 284 Main street, Buffalo, N. Y	July 3, 1889
NORTHWAY, WILLIAM RUFUS	City Engineer, Chicago, Ill	July 3, 1889
THOMPSON, BENJAMIN	Room 65, Richardson Block, Chattanooga, Tenn	July 3, 1889

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ASSOCIATES.

LIVINGSTON, JULIUS I.....Manager Standard Paint Co., Bound Brook, N. J..... July 3, 1889
MILLER, THOMAS SPENCER.....96 Liberty Street, New York City..... July 3, 1889

JUNIOR.

WOLFEL, LUDWIG PAUL.....Pencoyd Bridge and Construction Co., Pencoyd, Pa..... July 3, 1889

CHANGES AND CORRECTIONS.

DODGE, JOSEPH T.....Madison, Wis.
GATES, HORACE D.....Deputy City Engineer, 515 Derisadero street, San Francisco, Cal.
GERBER, EMIL.....With George S. Morison, Room 1120, The Rookery, Chicago, Ill.
GRANT, WILLIAM H.....Assistant Architect New Naval Observatory, Georgetown Heights, D. C., 1828 Jefferson Place, Washington, D. C.
HERBERT, ARTHUR P.....Woodbury. N. J.
HOLBROOK, FREDERICK W. D.....Manager Seattle, Lake Shore and Eastern Ry., Seattle, Wash.
MARR, GEORGE A.....U. S. Assistant Engineer, U. S. Engineer's Office, 1515 Lucas Place, St. Louis, Mo.
MORISON, GEORGE S.....Room 1120, The Rookery, Chicago, Ill.
MORRIS, MARSHALL.....People's Bank, Louisville, Ky.
PEARY, ROBERT E.....Civil Engineer U. S. N., U. S. Navy Yard, League Island, Pa.
SCHUYLER, JAMES D.....Commissioner of Public Works, San Diego, Cal.

ASSOCIATES.

HARRIS, CHARLES M.....35 Liberty street, New York City.
WARDER, JOHN H.....Athens, Pa.

JUNIORS.

BOOKER, BERNARD F.....(Care J. Steffan), Virginia City, Neb.
FISHER, ELSTNER.....Assistant Engineer Michigan Central R. R., 1133 Woodward avenue, Detroit, Mich.
MODJESKI, RALPH..... (Care George S. Morison), Room 1120, The Rookery, Chicago, Ill.
TACHARD, ANDRE P.....13 Rue Tronchet, Paris, France.
WHEELER, HARRY R.....Engineer in charge Tunnel, etc., N. Y., O. and W. Ry., Walton, N. Y.

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WILLIAMS, WILLIAM P.....7 West 31st street, New York City.
WOOD, CHARLES F.....First Assistant Engineer in charge of Sewer Work, City Hall, Raleigh, N. C.

DEATH.

LYON, WILLIAM M.....Elected Fellow March 23d, 1870; died July 3d, 1889.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV, August, 1889.

No meetings of the Society were held during August, 1889.

MEMOIRS OF DECEASED MEMBERS.

GEORGE DOANE ANSLEY, M. Am. Soc. C. E.

DIED SEPTEMBER 15TH, 1883.

George Doane Ansley was born in the City of Montreal, Canada, December 2d, 1836. He was the youngest son of the Rev. Amos Ansley, of Hull, Province of Quebec, but his early life was spent in the city of his birth, where his education was carried to the extent of graduation from the high school. With this for a foundation he commenced his special training for the profession of civil engineering in what is now the Province of Ontario. His first experience in the field was as a rodman upon the construction of the Port Hope and Lindsay Railway, in 1859. In the two succeeding years he was employed upon Government and municipal surveys in various capacities, and was in charge of a party at the time of his withdrawal to accept the position of Principal Field Assistant to Messrs. Plunkett & Brady, Engineers and Surveyors, in general practice in Montreal. This engagement continued from 1862 to 1866, when he turned his attention to commercial pursuits. After two years of business life he resumed the practice of his profession, being engaged as First Assistant Engineer on the survey and construction of the Quincy, Missouri and Pacific Railway, where he surveyed 125 miles of road, and located and constructed a short section.

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Following this he was employed during the year 1870 as Assistant Engineer upon the construction of the Keokuk and Hamilton Bridge over the Mississippi River. In November, 1870, he became General Superintendent of the Union Screw and Bolt Company's works at Chicago, but the Company being forced to close its affairs in 1872, by reason of the burning, for the second time, of its manufactory, Mr. Ansley accepted the General Management of the North Western Car Spring Works, which closed in June, 1873. In September of that year he was called to Montreal to assume the duties of Assistant Engineer on the staff of that city. In August, 1875, he was promoted to Deputy City Surveyor and Acting Chief in charge, followed by his appointment in July, 1876, to the position of City Surveyor and Engineer in charge of roads, parks and sewers, in which capacity he served with faithfulness and distinction until his death.

While making a professional visit to the Mount Royal Park, on September 15th, 1883, he was thrown from his horse with such violence as to fracture his skull, from which injury he died on September 22d, 1883, in the forty-seventh year of his age.

Mr. Ansley became a member of the American Society of Civil Engineers September 4th, 1878.

Mr. Ansley was a careful and able engineer, and possessed a warm-hearted, generous, obliging nature which won the friendship of all who were brought into business or social relations with him. The esteem in which he was held in his native city is commemorated by resolutions of regret and condolence to his wife and four children who survive him, passed by the City Council and by the members of the press of Montreal.

GEORGE HARFORD ELLIOTT, M. Am. Soc. C. E.

DIED OCTOBER 7TH, 1886.

Mr. George H. Elliott was born at Lancashire, England, October 2d, 1842. While yet a boy he came to this country, and catching the national spirit, espoused the cause of the Union, serving in the Federal army through the recent civil war. His connection with the army did not, however, cease with the fall of Richmond. He was engaged as Assistant Engineer in the construction of Fort Wool, Virginia, and also in the repair and preservation of Fort Monroe, Virginia.

From 1870 to 1874 Mr. Elliott's chief duties were in connection with the improvement of several of the rivers of the Atlantic coast, with a short intermission during a part of the years 1872 and 1873, when he had the supervision of modifications then being made in Fort Monroe. With the exception of a short time, during which he was detailed for

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special duties under the auspices of the Quartermaster's Department of the Army, he was in immediate charge of river and harbor improvements in Virginia and North Carolina, being stationed at Norfolk, Va.

He was highly respected, both as an engineer of acknowledged ability, and as a gentleman of courteous manner and kind heart. He had a large circle of acquaintance in the South, where he was widely known through his connection with works for the improvement of navigation, and where he is also remembered with feelings of warmest friendship by many who had the good fortune to know him intimately.

He entered the American Society of Civil Engineers as a member on April 4th, 1883.

Mr. Elliott was only in the prime of life—forty-four years of age—when he was suddenly stricken down by a congestive chill, October 7th, 1886.

WILLIAM L. BAKER, M. Am. Soc. C. E.

DIED MAY 28TH, 1888.

William L. Baker was born June 16th, 1850, at Toledo, O., being the eldest son of William Baker, the well known lawyer of that city. He early showed a predilection for mechanics, and his education was turned in that direction. He was graduated in 1871 at the Rensselaer Polytechnic Institute at Troy, N. Y. Immediately thereupon he entered briskly into professional duty. He was Assistant Engineer under Colonel E. D. Mason, M. Am. Soc. C. E., in the construction of the bridges over the Mississippi River at Hannibal, Mo., and subsequently of the bridge over the Missouri River at St. Joseph, Mo. His work there was of a character to attract the attention of the Managers of the Detroit Bridge and Iron Works, who were the contractors for those bridges, and in 1872 he entered the service of that company at Detroit, Mich., where he remained so long as he lived. Beginning in a subordinate capacity, his merits proved to be such that he was advanced step by step until he became Superintendent and Engineer of the entire establishment.

During the sixteen busy years of his life work with that company he designed and superintended the construction of a great number of iron bridges and roofs, and works of similar character, the uniform excellence of which bears witness to his professional ability. One can hardly ride over any of the railways of the Northwest without crossing some of his bridges.

With a keen analytical mind and a broad substratum of solid good sense, he was a hard student, and was devoted soul and body to his

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Committee to prepare memoir, Mr. Willard S. Pope, M. Am. Soc. C. E.

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work. He rejoiced in it and his principal pleasure was always found in it. Among his other qualifications he developed an excellent executive ability. He had the faculty of handling men, was a good judge of human nature, and succeeded well in the general management of affairs. His life work was just fairly opening, broad and full, before him, when, at the age of thirty-eight years, he was called upon to lay it all down. The immediate cause of his death was consumption.

But Mr. Baker was not solely an engineer. He was eminently of a social nature. Of warm heart, and winning, kindly manner, he always attracted people, and those who began as mere acquaintances, always, if intercourse was sufficiently prolonged, grew into attached comrades. Few young men had a larger list of warm and affectionate friends.

He was married in 1879 to Miss Kate Mead, of Lockport, N. Y., who, with two children, survives to mourn his loss.

He joined the American Society of Civil Engineers as Junior January 6th, 1875, and was made full member November 6th, 1878.

In his death our Society and the profession have lost a most worthy and promising member, and many fond hearts will long regret his early taking off.

NATHANIEL WEBSTER ELLIS, M. Am. Soc. C. E.

DIED JANUARY 16TH, 1889.

Some men challenge admiration simply by the possession of talent, or by the performance of notable feats in the line of their respective callings. Others, again, in addition to natural ability and acquired attainments, carry with them a spirit of good fellowship, such that one forgets to estimate them according to common standards, but accept them, without questioning their capabilities, as worthy of all the confidences of friendship. Nathaniel W. Ellis was a man of this kind—one in whom an unusually strong individuality was developed with that sweetness of nature whose power to awaken instant responsive sympathy in others is denominated "personal magnetism." This quality, all who knew him will attest, was possessed by Mr. Ellis in an eminent degree. Some unusual traits of character also are shown by the following tribute by a fellow townsman: "If he ever took offense scarcely any one knew it, and to hear him speak illy or slightingly of anybody was of such rare occurrence, that many of his most intimate friends can recall no such instance. He was kind, honest, sincere and whole-souled; a friend in whose company there was brightness, sunshine and congeniality; in business he was able and upright." His death was

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mourned as a public misfortune, as well as a personal sorrow to each citizen in Manchester, N. H., which city he had made the home of his adoption.

Mr. Ellis was born in the Village of Amesbury, Mass., in the year 1849. His father, removing to New York, amassed a considerable fortune, which enabled him to give his son the advantage of an excellent education. He must have been a precocious boy, for we hear of him as a baccalaureate from the Norwich University at the age of nineteen, and already manifesting so decided a propensity toward civil engineering that it was at once determined upon as his profession, and he began the study of it under Mr. James A. Weston, of Manchester, N. H. While here he was fortunate enough to have experience in railroad location and construction on the Suncook Railroad in New Hampshire, and he later became engineer in charge of a division on the Sugar River Railroad. The unusual talent he displayed is evidenced by his appointment, at the age of twenty-one, to a position on the corps of engineers engaged under Henry Meiggs upon the construction of the railroad from Arequipa to Puno, in Peru. This engagement lasted three years, before the termination of which his ability received further recognition, he having intrusted to his charge the construction of a 20-mile section of this road, in which was included the Sumbay Bridge.

Returning to the United States in 1874, he was engaged for a short time upon the Boston Water-works. He then settled in Manchester, N. H., where he opened an office, and entered upon general practice, forming a partnership in 1876 with Mr. Wallace Patterson. At one time he surveyed over portions of the Union Pacific and Central Pacific Railroads in the interest of Mr. C. P. Huntington; but the larger part of his work consisted in the construction of water-works, a branch of the profession in which Mr. Ellis was acquiring a wide reputation. He was connected with the building of water-works plants for Haverhill, Mass., Lisbon, Littleton, Laconia, and other places in New Hampshire. He also at one time did the engineering work for the City of Manchester, and is remembered as one of the active spirits in the establishment there of the People's Gas Light Company.

His death, which occurred at the Boston City Hospital on January 16th, 1889, was the remote effect of a severe bruise upon the head, which caused a disease of the bone, ending in inflammation of the brain.

Mr. Ellis became a member of the American Society of Civil Engineers February 2d, 1881.

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EDWARD BAUMANN, Assoc. M. Am. Soc. C. E.

DIED JANUARY 26TH, 1889.

Edward Baumann was born near Dantzic, Prussia, August 18th, 1838, and was a son of Albert Baumann, a leading merchant of that city. He was given a liberal education, completing his literary and preparatory course at the age of fifteen, when he entered the polytechnic school at Graudenz, from which he graduated in 1856. Immediately following this he came to America, and in the spring of 1857 arrived at Chicago, and entered the office of Burling & Baumann, architects (the latter partner of which was a relative of his), with whom he remained several years. In 1860, Mr. Baumann went to Memphis, Tenn., where he began the practice of his profession on his own account. The breaking out of the Civil War in the following year caused him to leave the South and to return to this city, where he has since resided. In 1868, Mr. Baumann married Miss Elise Steinbauer, a native of Prussia, and a lady of rare culture and worth. Mr. Baumann has been eminently successful in his professional work, and he has been likewise highly esteemed both as a man and a citizen, and many friends mourn his death. Among the memorials now standing of his labors may be mentioned the Metropolitan Block, the Ashland Block, the McCormick Reaper Factory, and many other large business blocks and fine residences in Chicago, and he was also the architect employed in remodeling the old Chamber of Commerce to a 14-story office building. Mr. Baumann was frequently engaged as an expert in figuring the safety of foundations and upper structures from other architects' plans, as for the new Board of Trade Building. In 1879, Mr. Baumann associated with William H. Lotz, M. Am. Soc. C. E., under the firm name of Baumann & Lotz, for the erection of Grain Elevators, Malt-houses and Breweries, and jointly they built Armour, Dole & Company's Elevator *D* with annex, having a storing capacity of 3 000 000 bushels, Rock Island Elevator *A*, and many smaller houses, and they also furnished plans for a large grain elevator to be built for the New York, West Shore and Buffalo Railroad, at Weehawken, N. J. They built the first pneumatic malt house, Saladin system, for the L. C. Huck Malting Company, and the new brew house for the P. Schoenhofen Brewing Company, of Chicago.

From overwork, Mr. Baumann, in the spring of 1888, contracted a nervous disease which greatly affected his eyes, and upon recommendation of his physicians, on July 7th, 1888, he went to Europe with his family, and in Berlin had an operation performed on one of his eyes which was successfully carried through. Then, going to Wiesbaden

Committee to prepare Memoir, Mr. William H. Lotz, M. Am. Soc. C. E.

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for further improvement, Mr. Baumann caught a bad cold, which settled upon his liver, and he died from a tumor of the liver at Berlin, on the 26th day of January, 1889, after a very painful illness. On the 29th of January his remains were cremated at Gotha, Saxony, this having been his desire.

Mr. Baumann leaves behind him his widow, and two children—a daughter, Miss Lettie Baumann, and a boy, Edgar B., of about thirteen years of age.

Mr. Baumann became an Associate of the American Society of Civil Engineers June 2d, 1880, and took an active interest in its proceedings, particularly while attending the Conventions held at St. Louis and at Denver.

ADDITIONS TO

LIBRARY AND MUSEUM.

From David E. Allen, West Chester, Pa.:

West Chester, Pennsylvania; its Industrial and Commercial Resources. Illustrated.

From American Institute of Mining Engineers. Dr. R. W. Raymond, Secretary, New York City:

Some Thoughts and Suggestions on Technical Education. T. Egleston.

Notes on the Topography and Geology of Western North Carolina. The Hiawassee Valley. Henry E. Colton.

Petroleum and Natural Gas in New York State. Charles A. Ashburner.

Some Recent Improvements in Open Hearth Steel Practice. Alfred E. Hunt.

Notes on the Topography and Geology of the Cerro de Pasco, Peru. A. D. Hodges.

The Blake System of Fine Crushing and its Economic Results. Theodore A. Blake.

Calculations of the Available Heat and the Required Dimensions of Chimneys, Combustion Chambers and Gas Burners in the Use of Blast Furnace Gases for Firing Boilers. Frank C. Roberts.

Systems of Mining in Large Bodies of Soft Ore. Richard P. Rothwell.

The Electric Motor in Mining Operations. George W. Mansfield.

A Water Manometer and Anemometer. J. M. Silliman.

Geological History of the Yellowstone National Park. Arnold Hague.

A Description of the Plant of the Boston Heating Company. Arthur V. Abbott.

Methods of Mining in the Menominee Range, Michigan. John Fulton.

The Cost of a Ton of Pig Iron in the Sequachee Valley. William M. Barrow.

Biographical Notice of Byron W. Cheever. William H. Pettee.

Method of Constructing Strata-Maps to Represent Stratification or Bedding. James T. Ives.

Structural Relations of Ore Deposits. S. F. Emmons.

The New York Mining Law. R. W. Raymond.

Note on Arsenic Determinations. R. C. Cauley.

An Aluminium Ore. Edward Nichols.

Efficiency of a Steam Boiler Using the Waste Gas of a Blast Furnace as Fuel. D. S. Jacobus.

Henderson Steel. Alfred F. Brainerd.

Map of Western North Carolina and Northeast Georgia, showing positions of Geological and Water Divides, and the peculiar Topography of the Western North Carolina Mountain Region.

Proceedings of the Fifty-first Meeting, Birmingham, Ala., May, 1888.

The Russell Process in its Practical Application and Economic Results. Ellsworth Daggett.

Twenty Years' Progress in the Concentration of Sulphuric Acid. W. H. Adams.

Western Kentucky Coals and Cokes. Joseph H. Allen.

Spirally Welded Tubing. J. C. Bayles.

Modes of Occurrence of Pyrite in Bituminous Coal. Amos P. Brown.

Certain Conditions in the Manufacture of Steel Rails which may Greatly Influence their Life in Service. Frederic A. Delano.

Note on a New Device for Operating Blast Furnace Charging Bells. Frank Calvin Roberts.

Trough Lixiviation. Ottokar Hofmann.

An Improved System of Water Supply for Hydraulic Mining. H. D. Pearsall.

Mode of Deposition of the Iron Ores of the Menominee Range, Michigan. John Fulton.

The Bedded Ore Deposits of Red Mountain Mining District, Ouray County, Colorado. G. E. Kedzie.

Husgafrel's Improved High Bloomary for producing Iron and Steel Direct from Ore, F. Lynwood Garrison.

Concentrating Magnetite with the Conkling Jig at Lyon Mountain, N. Y. Fred. S. Ruttmann.

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Proceedings of the Fiftieth (Annual) Meeting, Boston, Mass., February, 1888.
List of Officers, Members, etc., May, 1888.
Large Furnace on Alabama Material. Fred. W. Gordon.
The Losses in Roasting Gold Ores and the Volatility of Gold. Samuel B. Christy.
Notes on the Geology and on some of the Mines of Aspen Mountain, Pitkin Co., Colo. Carl Henrich.
Phosphate Slag. William B. Phillips.
The Grading of Birmingham Pig Iron. Kenneth Robertson.
The Petite Anse Salt Mine. Richard A. Pomeroy.
Mining in Soft Ore Bodies at Low Moor. W. S. Hungerford.
The Feasibility of Using Cheaper Fuels in the Blast Furnace. Jacob T. Wainwright.
Determination of Phosphorus in Iron and Steel. Porter W. Shiner.
Anthracite and Coke, separate and mixed, in the Warwick Blast Furnace. Edgar S. Cook.
Notes on the Iron Ores, Fuels, and Improved Blast Furnace Practice of the Birmingham District. Alfred F. Brainerd.
The Glenmore Iron Estate, Greenbrier County, West Virginia. William N. Page.
Note on a Specimen of Gilsonite from Uintah County, Utah. R. W. Raymond.
The Development and Statistics of the Alabama Coal Fields for 1887. Charles A. Ashburner.
Petroleum and Natural Gas in New York. C. A. Ashburner.
Asphalt and its Uses. F. V. Greene.
The Impurities of Water. A. E. Hunt and George H. Clapp.
Steel Rails and Specifications for their Manufacture. Robert W. Hunt.
The Mining Industry in its Relation to Forestry. B. E. Fernow.
Ferro-Silicon and the Economy of its Use. W. J. Keep and Edward Orton, Jr.
The Chlorination of Low-Grade Auriferous Sulphides. William B. Phillips.
The Northwestern Colorado Coal Region. G. C. Hewett.
The Minerals of Ontario and their Development. William Hamilton Merritt.
Large Furnaces on Alabama Material.—Discussion. Frederick W. Gordon.
Hot Spring Formations in Red Mountain District, Colorado District. A Reply to the Criticisms of Mr. Emmons. Theodore B. Comstock.
Note on Cast-Steel Water Jackets. Richard H. Terhune.
The Flue-Dust of the Furnaces at Low Moor, Va. Ellison C. Means.
Cement Rock and Gypsum Deposits in Buffalo. Julius Pohlman.
A Differential Regenerative Hot Blast Stove and its Application to an Open Hearth Blast Furnace. Jacob T. Wainwright.
Notes on the Roasting of the Hudson River Carbonates. Ingersoll Olmsted.
Water Gas as a Steam Boiler Fuel. D. S. Jacobus.
The Equalization of Load on Winding Engines by the Employment of Spiral Drums. E. M. Rogers.
Soaping Geysers. R. W. Raymond.
The Effect of Velocity and Tension of Gases on the Reduction of Ores in the Blast Furnace. Theodore W. Robinson.
Notes on the Rosario Mine at San Juancito, Honduras, C. A. Thomas H. Leggett.
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Contents and Index, Vols. I to XV, inclusive.
Transactions, Vol. XVI, May, 1887, to February, 1888, inclusive.

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Meter Tables giving number of United States gallons for each cubic foot from 1 to 1 000 000. George A. Ellis, Boston, 1888.

From American Society of Mechanical Engineers. F. R. Hutton, Secretary, New York City:

Transactions, Vol. IX, 1888.

From William H. Bailey, New York City:

Description of Rice's Patent Feed Water Heater and Purifier with Pump combined.

From Bates and Kimball, Boston, Mass.:

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From Onward Bates, Milwaukee, Wis.:

General Specifications for Wrought-Iron and Steel Structures, July 1st, 1888.

From Professor Arthur Beardsley, Swarthmore, Pa.:

Apercu de Quelques Difficultes A vaincre dans La construction du Canal de Panama. Le Dr. Wolfred Nelson, Paris, 1887.

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Annual Report of the Chief of Ordnance to the Secretary of War for the fiscal year ended June 30th, 1887.
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Ordnance Notes, No. 45. The Cellular Theory of Steel.
Ordnance Notes, No. 46. On the Erosion of Gun-Barrels by Powder Products. Sir Frederick Abel.
Ordnance Notes, No. 47. Probability of Fire. Lieutenant William Crozier.
Index of Ordnance Notes, Nos. 1 to 357, inclusive, Vols. I to XIII.

From George H. Benzenberg, Milwaukee, Wis.:

Annual Report of the Board of Public Works of Milwaukee, Wis., for the years 1882, 1883, 1887.

From Walter G. Berg, Perth Amboy, N. J.:

Two Photographs of Specimens of Wood Treated with Fernaline or Wood Creosote Oil, also with Coal Tar Creosote (Dead Oil or Tar).

From John S. Billings, Surgeon-General U. S. A., Washington, D. C.:

Index Catalogue of The Library of the Surgeon-General's Office United States Army. Vol. IX, 1888.

From John Birkinbine, Philadelphia, Pa.:

Report on the Water Power of the St. Louis River.

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From the Board of Trade of Grand Rapids, Mich.:

Grand Rapids, Michigan, as it is. Published by the Board of Trade.

From the Board of Supervisors, San Francisco, Cal.:

San Francisco Municipal Reports for the fiscal year 1887–88, ending June 30th, 1888.

From Hon. John Bogart, New York City:

Thirtieth Annual Report of the Trade and Commerce of Chicago for the year ended December 31st, 1887.

Annual Report of the State Engineer and Surveyor on the Canals of New York for the fiscal years ending September 30th, 1885 and 1887; also Maps of Report of State Engineer on Canals.

Nineteen Maps of the Adirondack Wilderness and adjoining Territory.

From W. W. Bonnett, Waterbury, Conn.:

Twenty-first Report of the Board of Water Commissioners of the City of Waterbury for the year ending December 31st, 1887.

From Brooklyn Library, Adrian Van Sinderan, Secretary:

The Thirtieth Annual Report of the Board of Directors of the Brooklyn Library.

From Otto Carl Edward Budde, Essen, Germany:

Ueber das Durchschlagen von Panzerplatters Erste Folge, Essen, 1888.

From Bureau of Education, Washington, D. C.:

Industrial Education in the South, by Rev. A. D. Mayo, Washington, 1888.

Proceedings of the Department of Superintendence of the National Educational Association at its meeting at Washington, March 15th–17th, 1887.

Report of the Commissioners of Education for the years 1886–87.

From Bureau of Navigation, Navy Department, Washington, D. C.:

Pilot Chart of the North Atlantic Ocean for May, June, July, August, September, October, November, December, 1888; January, February, 1889; and Supplement to the Chart for August, 1888, showing reports of Logs from the Great Raft and Timber from Vessels' Deck Loads; also Supplement to the Chart for February, 1889, referring to the Derelict American Schooner *W. L. White*, together with the Tracts of three other notable Derelicts and the General Drift of Ocean Currents.

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Annual Report of the Commissioner of Pensions for 1888.

From Bureau of Statistics, Washington, D. C.:

Technical Education in Europe. First Part.

Industrial Education in France. J. Schoenhof.

Statistical Abstract of the United States, 1887. Tenth Number.

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Annual Report of the Canadian Institute, Session 1886–87, being part of Appendix to the Report of the Minister of Education. Ontario, 1887.

Proceedings. Third Series. Vol. V. 1886–87.

From Robert Cartwright, Rochester, N. Y.:

The Prall Patents for Central Station Heating and Power Supply by the Use of Superheated Water. Address by A. V. Abbott, C. E., before the Boston Society of Civil Engineers.

From Gen. Thomas Lincoln Casey, Chief of Engineers, Washington, D. C.:

Advertisements, Specifications and Proposals, as follows:

For Improvement of Black Warrior River, Alabama;

For Furnishing One Dredge and One Tug; for Improving Clinton River, Michigan.

For Constructing a Steam Propeller.

For Wrought-Iron Work.

For Hoisting Engines.

For Furnishing one Dredge, one Tug and two Dump Scows for Removing Shoals in and around the Harbor of Refuge, Sand Beach, Michigan.

For Dimension Stone.

For Reconstruction of the Aqueduct Bridge, D. C.

For Timber.

For Constructing Dike near Mifflin Bar.

For Iron Drift Bolts.

For Constructing Dike at Reedy Island.

For Cement.

For Timber, Iron and Stone.

For Constructing Breakwater at Agate Bay, Minnesota.

For Improving Entrance to Humbolt Bay, Cal.

For Pier Construction in front of Fort Brady, at Saint Mary's Falls Canal, Michigan.

For Building Dam at Paradise Cut, on the San Joaquin River, Cal.

For Repairing Snagboat.

For Four Model Barges, North Columbia River, Oregon.

For Removal of Ledge from Manchester Harbor, Mass.

For Improving Cambridge Harbor, Maryland.

For Removal of Ledge from Hingham Harbor, Mass.

For Improvement of Ice Harbor at Marcus Hook, Pa.

For Pier Extension and Superstructures at Ontonagon, Michigan.

For Lumber for Improving Harbor at New Orleans, La.

For Improving Harbor of Duluth, Minnesota.

For Improvement of Oakland Harbor, California.

For Poles and Brush for Improving Harbor at New Orleans, La.

For Improvement of Wilmington Harbor, California.

For the Delivery of Granite Ashlar at Gallop's Island, Boston Harbor, Mass.

For Repair of Delta Point, La.

For Improving Mississippi River, Lake Providence Reach.

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For the Delivery of Stone and Brush for Provincetown Harbor, Mass.
For Cement, Stone, and Pebbles.
For Hard Times—Wilson Levee, Tensas Parish, Louisiana.
For Removal of Wrecks from St. John's River, Florida.
For Improving Choptank River, Maryland.
For Improving Mississippi River, Lake Bolivar Front.
For Improving Duck Creek, Delaware.
For Improving St. John's River, Florida.
For Dredging Saginaw River, Michigan.
For Dredging in Lynn Harbor, Mass.
For Dredging in Wellfleet Harbor, Mass.
For Dredging Approach to Norfolk Harbor and U. S. (Norfolk) Navy Yard, Va.
For Dredging in Harbor at Norfolk and its Approaches, Va
For Dredging in Boston Harbor, Mass.
For Dredging in the Harbor at Grand Marais, Minnesota.
For Dredging in Scituate Harbor, Mass.
For Dredging in Superior Bay and St. Louis Bay, Wisconsin.
For Dredging in Biloxi Bay, Miss.
For Dredging and Constructing Dam in Pascagoula River, Miss.
For Constructing Revetment and Beam Wall and for Dredging at Carrollton, Saginaw River, Michigan.
For Rock Excavating and Dredging in Niagara River, New York.
For Dredging at Hyannis Warehouse and New Bedford Harbor, Mass.; Newport, R. I.; Pawtucket, Providence and Paucatuck Rivers, R. I., and Green Jacket Shoal, Providence Harbor, R. I.
For Dredging in Ticonderoga River, New York, and Otter Creek, Vermont.
For Dredging at Ogdensburg Harbor, N. Y.
For Dredging Mosquito Creek, S. C.
For Dredging and Removing Ledge in York Harbor, Maine.
For Improving the Mississippi River below Cairo, Ill.
For Improving the Harbor at Cedar Keys, Florida.
For Improvement of Manatee River, Florida.
For Improvement of Tampa Bay, Florida.
For Improvement of Oakland Harbor, California.
For Rebuilding and Repairing U. S. Propeller *Maud*, Mobile, Ala.
For Rubble-Stone to be delivered at the Harbor at Beaufort, North Carolina.
For Improving Cambridge Harbor, Maryland.
For Pier Construction at Harbor of Ludington, Mich.
For Improving Choptank River, Maryland.
For Improving Duck Creek, Delaware.
For Revetting Banks of Wappo Cut, S. C.
For Improving the Inland Waterway from Chincoteague Bay, Virginia, to Delaware Bay, at or near Lewis, Delaware.
For furnishing Piles, Stone, Manila Rope, Wire, Nails, Spikes and Screw Bolts, for Government Works on the Mississippi River, near St. Louis, Mo.
For Dredging Moose-a-bec Bar, Maine.
For Dredging in Penobscot River, Maine, between Bangor and Crosby's Narrows.
For Dredging at mouth of Harlowe Creek, Inland Waterway between New Berne and Beaufort, N. C.
For Dredging in Rockport Harbor, Maine.
For Dredging in Camden Harbor, Maine.
For Dredging in Harbor at Back Cove, Portland Harbor, Maine.
For Dredging in Beaufort Harbor, North Carolina.
For Dredging in Narraguagus River, Maine.
For Dredging in Lubec Channel, Maine.
For Dredging in Bellamy River, New Hampshire.
For Dredging in New River, North Carolina.
For Dredging in Harbor at Georgetown, S. C.
For Improving Appomattox River, Virginia.
For Rock for Jetty at mouth Columbia River, Oregon.
For Dimension Stones Columbia River, Oregon.
For furnishing material at Muskegon Harbor, Mich.
For furnishing material at Frankfort Harbor, Mich.
For furnishing material at Manistee Harbor, Mich.
For furnishing material at Grand Haven Harbor, Mich.
For Improving Harbor at Pentwater Harbor, Mich.
For Stone and Mattress Work in Savannah Harbor and River, Ga.
For Constructing Jetty at Entrance to Cumberland Sound, Ga. and Fla.
For Construction of Wing Wall at Harbor of Saint Joseph, Mich.
For Improving Harbor at Charlevoix, Mich.
For furnishing material at Saugatuck Harbor, Mich.
For Improving Harbor at Michigan City, Ind.
For Improving Harbor at South Haven Harbor, Mich.
For furnishing material at White River Harbor, Mich.
For Removal of Wreck off Cape May, New Jersey.
For Dredging at Harbor of Refuge at Portage Lake, Mich.
For Dredging in Cape Fear River, North Carolina.
For Improvement of Harbor at Delaware Breakwater.
For Excavating Channel and Building Dike at Middle Neelish Hay Lake Channel, Michigan.
For furnishing and delivering at Keokuk, Iowa, about 425 000 feet, B. M., of Timber.
For Construction of Exterior Breakwater, Harbor of Refuge, Chicago, Illinois.
For furnishing Stone for use at the Des Moines Rapids Canal and Dry Dock.
For South Pier Extension, Calumet Harbor, Ill.
For furnishing and delivering at Keokuk, Iowa, about 27 000 pounds Round and Flat Bar Iron.
For Building Guard Cribs at Lock No. 2, Great Kanawha River Improvement.
For Improvement of Ice Harbor at Marcus Hook, Pa.
For Improving of Schuylkill River, Pennsylvania.
For Improving of Potomac River near Washington, D. C., Dredging and Embankment.
For Improving of Potomac River near Washington, D. C., Dredging.
For Improving Nomini Creek, Virginia, Dredging.
For Improving Channel at Mount Vernon, Va., Dredging.
For Improving Patuxent River, Maryland, Dredging.

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For Improving York River, Virginia, Dredging.
For Improving Breton Bay, Maryland, Dredging.
For furnishing one Dredge, one Tug, and two Dump Scows, for Removing Shoals in Saint Clair Flats Canal, Michigan.
For Dredging in Little Harbor, New Hampshire.
For Dredging in Calumet River, Illinois, between its Mouth and 108th Street.
For Improving Entrance to Coos Bay, Oregon.
For Improving Ship Channel in Galveston Bay, Texas.
For Improving Raritan Bay, New Jersey.
For Improving Gowanus Bay, New York Harbor.
For Construction of Breakwater at Gordon's Landing, Lake Champlain, Vermont.
For Breakwater at New Haven, Conn.
For Construction of Breakwater at Port Chester, N. Y.
For Extension of Breakwater at Greenport, N. Y.
For Removing Obstructions in East River at Hell Gate.
For Improving Appomattox River, Virginia.
For furnishing the labor and material for repairing and building dams and shore protections on the Mississippi River, between Des Moines Rapids and the mouth of the Illinois River.
For Improving Napa River, California.
For Improving Mississippi River, 3d District.
For Extending the Dike in New Haven Harbor, Conn.
For Construction of Breakwater at Burlington Harbor, Vermont.
For Dredging in Five Mile River Harbor, Conn.
For Dredging in Milford Harbor, Conn.
For Dredging at Orchard Harbor, N. Y.
For Dredging and Excavating Rock at Wilson Harbor, N. Y.
For Dredging and Excavating Rock at Olcott Harbor, N. Y.
For Dredging in Stamford Harbor, Conn.
For Dredging in Bridgeport Harbor, Conn.
For Dredging at Wilson's Point, Norwalk Harbor, Conn.
For Building Lock No. 7, Great Kanawha River, W. Va.
For the Delivery of Rubble-Stone for Newburyport Harbor, Mass.
For Improving Harbor at Sheboygan, Wis.
For Constructing Brush and Stone Dike at Reedy Island, Delaware River.
For Constructing a Pile and Stone Dike between Fisher's Point and Petty's Island, Delaware River.
For Improving the Inland Waterway from Chincoteague Bay, Virginia, to Delaware Bay, at or near Lewis, Delaware.
For the Delivery of Rubble-Stone for Harbor of Refuge, Sandy Bay, Cape Ann, Mass.
For Improving Mispillion Creek, Delaware.
For Improving Saline Harbor, Texas.
For Rebuilding Superstructure at Manitowoc Harbor, Wis.
For Construction of Breakwater at Rouse's Point, Lake Champlain, N. Y.
For Construction of Breakwater, Harbor of Refuge, Milwaukee Bay, Wis.
For Building Lock-keeper's House at Lock No. 1, Cumberland River.
For Pier Extension at Kewaunee Harbor, Wisconsin.
For Revetment Construction at Saint Clair Flats Ship Canal, Michigan.
For Dredging Kenosha Harbor, Wisconsin.
For Dredging Waukegan Harbor, Illinois.
For Dredging Racine Harbor, Wisconsin.
For Dredging in Jekeyl Creek, Georgia.
For Dredging in Savannah River, Georgia.
For building Coffer-dams, Excavating Lock-pit, and Constructing part of Lock No. 1, Cumberland River.
For the Improvement of Mobile Harbor, Alabama.
For a Shore Protection at Erie, Pa., and for the Iron to be used therein.
For Ice Piers in the Ohio River.
For Cement, Bricks, Lumber and Shingles for Improvement of Black Warrior River, Alabama.
For Improving Buffalo Bayou, Texas.
For Removing Ledge of Solid Rock and Boulders from Detroit River.
For Timber.
For Dredging in Brunswick Harbor, Georgia.
For Dredging at Bulkhead Shoal, Delaware River.
For Dredging the Channel between the Islands of North Hero and South Hero, Lake Champlain, Vermont.
For Dredging at Plattsburgh Harbor, New York.
For Dredging and Blasting in Gloucester Harbor, Massachusetts.
For Dredging in Ipswich River, Massachusetts.
For Dredging in Plymouth Harbor, Massachusetts
For Dredging at Mifflin Bar, Delaware River.
For Dredging Bar at Head of Bayou La Fourche, Louisiana.
For Dredging in Portland Harbor, Maine.
For Dredging in the Calumet River, between the Forks and one-half mile east of Hammond, Ind.
For Dredging in Channel leading to Harbor at Baltimore.
For Stone Revetment.
For Dredging at Rouge River, Michigan.
For Building No. 7 Lock House and Outbuildings, Great Kanawha River Improvement.
For Protecting the Shore of Aransas Pass, Texas, from Erosion.
For Building a Jetty at Entrance to Galveston Harbor, Texas.
For Dredging Rock Excavation, Construction of Dikes, etc., in James River, Va.
For Dredging Chicago Harbor, Ill.
For Dredging Stearn's Dyke Cut in James River, Virginia.
For Dredging at Narrows of Lake Champlain, New York.
For Building four Scows for James River, Virginia.
For Removal of Wrecks in Boston Harbor, Mass.
For Modifying Draw Protection and Guide Piling of the Old Colony Railroad Bridge over the Taunton River at Somerset, Mass.
For furnishing and placing Rip-rap Granite in the Eastern Jetty at Nantucket, Mass., and in the Eastern Breakwater at Stonington, Conn.
For Dredging in Thames River, Connecticut.
For Dredging in Norwalk River, Connecticut.

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For Building Superstructures and Dredging between Harbor Piers at Grand Marais, Mich.
For Improvement of San Luis Obispo Harbor, California.
Report relative to Obstructions in the Columbia River.
A Supplemental Report of the Mississippi River Commission.
Report of a Board of Engineers on the practicability of improving the Ohio River below Pittsburgh by means of movable dams.
The second preliminary report of a Board of Engineers upon obstructions to navigation in the Columbia River, and upon the feasibility of a boat railway at the Dalles and Celilo Falls.
Report relative to the commerce of the St. Mary's Falls Canal, Michigan.
Report in relation to the admission free of duty of a foreign vessel for dredging the main ship-channel, New York Harbor.
Report on proposed improvement in Willamette River.
Report of a Board of Engineers relative to a plan for improving the mouth of the Cumberland River.
Report relative to the construction of bridge at Omaha.
Report concerning a breakwater at the mouth of the Housatonic River.
Report on the condition of Fort Moultrie.
Report on the cost of approaches to the Aqueduct Bridge.
Report relative to the condition of the Missouri River near Sioux City, Iowa.
Report relative to underground telegraph and telephone wires.
Reports and estimates of the proposed improvement of Arkansas River.
Report relative to a bar in the Columbia River.
Report of the Board of Engineers appointed to examine into Smith's Windmill, and Petty's Island, Delaware River.
Report on the cost of removing sand-bar at Block Harbor, Rhode Island.
Report upon the work of deepening Sandy Hook Ship-channel.
Report upon the construction of the State, War, and Navy Building.
Report relative to the proposed changes in the bridge across the Arthur Kill.
Report of the examinations and survey of the Hudson River from New Baltimore to Coxsackie.
Report relative to fortifications upon Puget Sound.
Report of the examination and survey of the thoroughfare running from Cape May to the Great Bay north of Atlantic City, N. J.
Report as to the cost of breakwater at Santa Monica Harbor, California.
Report with estimate for appropriation to pay for gauging waters of Lower Mississippi River.
Report respecting the proposed bridge over the Ohio River between Louisville, Ky., and Jeffersonville, Ind.
Report on the Salmon fisheries of the Columbia River.
Legislation relative to the regulation of the Saint Clair Flats Canal.
An estimate of an appropriation for the construction of barracks at Willett's Point, N. Y.
Annual Report upon the Improvement of Certain Rivers and Harbors in Maryland, Virginia and North Carolina, in charge of Mr. S. T. Abert, being Appendix L.
Annual Report upon the Improvement of the Navigation of Red River, Louisiana, and of Certain Rivers in Louisiana, Mississippi, Arkansas, and Tennessee, and Water Gauges on the Mississippi and its principal Tributaries, in charge of J. H. Willard, being Appendix U of the Annual Report of the Chief of Engineers for 1887.
A list of the Civilian Engineers employed on River and Harbor Improvements, showing the time and place of employment and the compensation paid each.
Quarterly Statement United States Army, Washington, D. C., April 13th, August 1st, October 2d, 1888, and January 12th, 1889.
Annual Report of the Chief of Engineers of the U. S. Army. Parts I, III and IV, 1887. Parts I, II, III and IV, 1888.

From Madame A. Durand Claye, Paris, France:

Rapport sur le Desséchement du Lac Copais (Grece) par M Alfred Durand Claye, Ingenieur in Chef des Ponts et Chaussées.

From William B. Cogswell, Syracuse, N. Y.:

Framed Photograph Works of the Solvay Process Company at Geddes, near Syracuse, N. Y.

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Algemein Verslag van de Werkzaam heden. Rekening en Verant woording lijst van Geschenken en Naamlijst der Leden over het Instituutsjaar 1869-1870.

From W. H. Russell, Springfield, Mass.:

Annual Reports of the Boston and Albany Railroad Company for the years 1872, 1880, 1886, 1887.

From Lieut. Richard Rush, Washington, D. C.:

Catalogue of the Exhibit of the Navy Department at the Centennial Exposition of the Ohio Valley and Central States at Cincinnati, Ohio, July 4th to October 27th, 1888.

From C. P. Sandberg, London:

Sandberg on the Use of Heavier Rails for Safety and Economy in Railway Traffic. C. P. Sandberg, London, 1889.

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From William H. Sayward, Boston, Mass.:

Second Annual Convention of the National Association of Builders of the United States of America, held at Cincinnati, Ohio, February 7th, 8th and 9th, 1888.

From C. C. Schneider, New York City:

General Specifications for Railroad Bridges.

From Collingwood Schreiber, Ottawa, Canada:

Reports of the Railway Statistics of Canada for the year 1887.

From F. H. Short, Cincinnati, Ohio:

Annual Reports of the Cincinnati, Hamilton and Dayton Railroad for the years 1849, '51, '52, '57, '59, '60, '63, '64, '65, '66, '67, '80, '83, '84, '85 and '86.

From A. H. Simpson, New York City:

Annual Report of the Chief of the Bureau of Construction and Repair to the Secretary of the Navy for the fiscal year ended June 30th, 1887.

Report on European Dock Yards by Naval Construction. Philip Hichborn, U. S. N.

Views of Simpson Patent Improved Timber Dry Dock constructed by J. E. Simpson.

From Smithsonian Institution, Washton, D. C.:

Additions and Corrections to the List of Foreign Correspondents to July, 1888. George H. Boehmer, Washington, 1888.

Systematic Arrangement of the List of Foreign Correspondents, July, 1888. George H. Boehmer, Washington, 1888.

Copyright and Patents for Inventions, Vol. I, Copyright, 1879. Vol. II, Patents, 1883.

Verities in Verses combining Mottoes and Motives; Brotherhood, Fellowship and Acting Together; New Covenant Ordinances and Orders.

Annual Report of the Board of Regents of the Smithsonian Institution to July, 1885. Part II.

From Society of Engineers; Charles Julien Light, Secretary, London:

Transactions for 1887, and General Index, 1861–1886.

From F. D. Soone, Philadelphia, Pa.:

Banquet given to the Learned Societies of Philadelphia at the American Academy of Music, September 17, 1887. Closing the Ceremonies in Commemoration of the Framing and Signing of the Constitution of the United States.

From the State Board of Health of Massachusetts; Samuel W. Abbott, Secretary, Boston, Mass.:

Nineteenth Annual Report of the State Board of Health of Massachusetts.

From C. Stevens, Secretary San Francisco Free Public Library, San Francisco, Cal.:

Annual Report of the Board of Trustees of the San Francisco Free Public Library for the fiscal year ending June 30, 1888.

From Stevens Institute, Hoboken, N. J.:

The Stevens Indicator, Vol. V, No. 4, and Vol. VI, No. 1, January, 1889.

From Robert Surtees, Ottawa, Canada:

Annual Report of the Water Works Committee for the year ending 31st October, 1888.

From Professor George F. Swain, Boston, Mass.:

Reports on the Water Power of the United States, Part II, Vol. XVII. Tenth Census, 1880.

Ancient Covered Reservoirs. Charles H. Swain.

From Thomas M. R. Talcott, Atlanta, Georgia:

Appendix to the Thirtieth Annual Report of the Richmond and Danville Railroad Company, being a Supplementary Report of the General Superintendent on the Cost of Transportation.

From Edgar C. Thrupp, London:

A Paper on a New Formula for the Flow of Water in Pipes and Open Channels. Edgar C. Thrupp, London, 1888.

From John C. Trautwine, Jr., Philadelphia, Pa.:

The Civil Engineer's Pocket Book for 1888.

From A. J. Tullock & Co., Leavenworth, Kansas:

One Framed Photograph of the La Mine River Bridge.

From Union Bridge Co., New York City:

One Photograph and Album of Van Buren Bridge.

Two Framed Photographs of Poughkeepsie Bridge.

From United States Coast and Geodetic Survey, Washington, D. C.:

Report of the Superintendent of the United States Coast and Geodetic Survey showing the progress of the work during the fiscal year ending with June, 1886.

Bulletin No. 3. Tidal Levels and Flow of Currents in New York Bay and Harbor.

Bulletin No. 4. Resources of and Developments in Alaska.

Bulletin No. 5. The Value of the "Arcano Del Maro" with References to our Knowledge of the Magnetic Declination in the earlier part of the Seventeenth Century.

Bulletin No. 6. Secular Variation in the Position of the Agaric Line of the North Atlantic and of America, between the epochs 1500 and 1900 A. D.

Bulletin No. 7. Historical Review of the Work of the Coast and Geodetic Survey in connection with Terrestrial Magnetism.

Bulletin No. 8. Currents of New York Bay and Harbor.

From United States Geological Survey, Washington, D. C.:

Mineral Resources of the United States for the calendar year 1887.

Bulletins of the United States Geological Survey, Nos. 40 and 47.

Mineral Products of the United States, calendar years 1882 to 1887.

Atlas to Accompany a Monograph on the Geology and Mining Industry of Leadville, Col. Samuel Franklin Emerson, Washington, 1883.

Thirty-seven United States Atlas Sheets.

From United States Commission of Fish and Fisheries. Spencer F. Baird, Commissioner, Washington, D. C.:

Reports of the Commissioner of Fish and Fisheries for the years 1872 to 1885, Parts II to XIII, inclusive.

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Bulletins of the United States Fish Commission, Vols. I, II, III, IV, V, VI for the years 1881 to 1886, inclusive.

The Fisheries and Fishery Industries of the United States. George Brown Goode, Washington, 1887.

From United States Light House Board, Washington, D. C.:

List of Beacons, Buoys Stakes and other Day Marks in the First and Second Light House District, corrected to May and June 1st, 1888.

Annual Report of the Light House Board for the fiscal year ended June 30th, 1888.

From United States Navy Department, Washington, D. C.:

Coaling, Docking and Repairing Facilities of the Ports of the World, with analyses of different kinds of coal.

Report of the Tests of Metals and other Materials for Industrial Purposes during the year ended June 30th, 1885.

Naval Reserves, Training and Material, June, 1886. General Information Series, No. VII, 1888.

From J. E. Watkins, Curator Section of Transportation and Engineering, Smithsonian Institution, Washington, D. C.:

Contributions of the Department of Transportation and Engineering to the Ohio Valley Centennial Exhibition, 1888.

From Edward B. Weston, Providence, R. I.:

Notes on the Water Meter System of Providence, R. I., from 1872 to 1887, inclusive.

From S. S. Wheeler, New York City:

Second Report of the Board of Electrical Control for the City of New York.

From Fred. H. Whipple, Detroit, Mich.:

Whipple's Water Supply, 1888-1889. Fred. H. Whipple, Detroit, 1889.

From John Wiley & Sons, New York City:

The Design and Construction of Masonry Dams, giving the Method Employed in Determining the Profile of the Quaker Bridge Dam. Edward Wegmann, Jr., New York City, 1888.

From Messrs. Whitman & Chaphe, St. Louis, Mo.:

Report of the Board of Public Improvements of St. Louis. Vol. I, 1879-1883; Vol. II, 1884-1887.

From John A. Wilson, Philadelphia, Pa.:

Arguments, Opening and Closing, of W. C. Kress, Counsel for Plaintiff in the Case of Frank McLaughlin vs. The Beach Creek, Clearfield and Southwestern Railroad Company and George J. Magee.

Frank McLaughlin vs. George J. Magee, General Contractor, and the Beach Creek, Clearfield and Southwestern Railroad Company.

Testimony in the Case of Frank McLaughlin vs. George J. Magee, General Contractor, and the Beach Creek, Clearfield and Southwestern Railroad Company.

Ordinance of the Philadelphia and Reading Terminal Railroad Company, presented to Select Council of Philadelphia, April 19th, 1888.

From Carl Winiker, Brunn, Austria:

Das Neue Tacheometer.

From Henry R. Worthington, New York City:

The Worthington High Duty Pumping Engine for the Public Water Supply.

From other sources:

Report of Proceedings of the New York Railroad Club at the Monthly Meeting, November 15th, 1888.

Recent Discussion on the Abolition of Patents for Inventions in the United Kingdom, France, Germany, and the Netherlands.

An Address to the Friends of Mississippi River Improvement and of Improved Waterways.

Speech of Hon. Joseph E. Brown of Georgia on the Proper Mode of Collecting the Revenues of the United States.

Speech of Hon. Thomas B. Reed of Maine on the Tariff.

Underground Conduits for Electrical Conductors and System of Distribution.

Colorado Horticultural Report for the years 1882, '83 and '84, Vol. 1.

The Electric Magazine of Foreign Literature, June, 1888.

Some Applications of Graphical Statics. James R. Willett.

Description of the Canadian Pacific Railway.

Tornado Circular No. 1. New Series.

Recent Advances in Electricity.

The Official Railway List, 1888.

Report of the Commission of Expert Engineers on Railroad Terminal Facilities.

First Report of the Board of Electrical Control for the City of New York.

Fourth Report of the Board of Commissioners of Electrical Subways of the City of Brooklyn, December 15th, 1887.

Report of the Third Annual Meeting of the Illinois Society of Engineers and Surveyors, held at Springfield, January 25th, 26th and 27th, 1888.

In Assembly Committee on General Laws upon the Hearing relative to Assembly Bill No. 552, entitled "An Act to Reduce the Cost of Telegraph Messages in the State of New York."

Théorie de M. Maurice Lévy Table pour le calcul des conduits. M. H. Vallot, Paris, 1888.

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LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
Buck, Waldo Emerson	544 Main st., Woburn, Mass	July 3, 1889
Kernot, William Charles	University of Melbourne, Melbourne, Victoria, Australia	March 6, 1889
Smith, Samuel Harrison	City Engineer, San Francisco, Cal	July 3, 1889

JUNIORS.

Johnston, Stewart	Superintendent The Pittsburgh Steel Casting Co., Pittsburgh, Pa	March 6, 1889
Kibbe, Augustus Sayre	Assistant Engineer New York State Canals, 55½ Myrtle ave., Albany, N. Y	March 6, 1889

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

Adams, Julius W	155 Congress st., Brooklyn, N. Y.

MEMBERS.

Bassel, Robert	Royal Inspector Railway Construction and Traffic, Frankgasse 23, Koln-am-Rhine, Germany.
Breckenridge, Cabell	Marietta, Ohio.
Calkins, Frank A	Ogden, Utah.
Dunlap, De Clermont	Rockford, Ill.
Gatchell, George S	Manager The Associated Elevators, Buffalo, N. Y.
Gillette, Edward, Jr	Care B. and M. Engineer office, Lincoln, Neb.
Griswold, Frank L	Consulting Engineer, 443 Calle Peru, Buenos Ayres, Argentine Republic.
Hegeman, William W	General Superintendent Ohio Valley R. R., Evansville, Ind.
Herbert, Arthur P	Mexican Central R. R., Mexico, Mexico.

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HORTON, HORACE E.....443 Rookery, Chicago, Ill.
KILLEBREW, SAMUEL.....Chief Engineer Frontera Div. Mexican Pacific Ry., San Juan Bautista, Tabasco, Mexico.
KNAPP, LOUIS H.....Superintendent and Engineer Buffalo Water Works, 280 Linwood ave., Buffalo, N. Y.
LIBBY, EDMUND D.....41 Reservoir ave., Providence, R. I.
MCNULTY, GEORGE W.....45 Broadway, New York City.
PAINE, ARTHUR B.....Windsor Hotel, New York City.
REA, SAMUEL.....Vice-President Maryland Central Ry. Co., 9 St. Paul st., Baltimore, Md.
RODD, THOMAS.....Chief Engineer North West System, Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.
ROSS, JAMES.....Windsor Hotel, Montreal, Canada.
RUGGLES, WILLIAM B.....Chief Engineer Cincinnati Circular R. R., United Bank Bldg., Cincinnati, Ohio.
SAMPLE, JOHN H.....Granville, Licking Co., Ohio.
SLATAPER, FELICIAN.....Consulting Engineer North West System, Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.
SMITH, WILLIAM SOOY.....652 Rookery Bldg., Chicago, Ill.
SONNE, OTTO F.....Rockwood, Tenn.
STRIEDINGER, JULIUS H.....Tombstone, Arizona.
WARDLAW, JAMES R.....24 State st., New York City.
WILSON, ELLIOTT H.....(Care Wilson & Gillie), Butte, Montana.

JUNIORS.

BUTTS, ELIJAH P.....Cairo Bridge, Cairo, Ill.
CARROLL, EUGENE.....Covington Reservoir, Covington, Ky.
DAY, G. FREDERICK P.....139 Mt. Vernon st., Fitchburg, Mass.
HORTON, SANDFORD.....Niobrara, Knox Co., Neb.
MCCORMICK, GEORGE K.....Resident Engineer Louisville and Nashville R. R., Bailey, Va.
PENNEY, WILLIAM W.....Office of Water Commissioner, St. Louis, Mo.
VILLALON, JOSÉ R.....Room 42, U. S. Army Bldg., New York City.

DEATH.

THAW, WILLIAM.....Elected Fellow August 30, 1871; died August 17, 1889.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV, September-October, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

SEPTEMBER 4TH, 1889.—The Society met at 20 o'clock, W. W. Walker, M. Am. Soc. C. E., in the chair; John Bogart, Secretary. Ballots for Membership were canvassed, and the following candidates declared elected: As Member, Bushrod Wilber Taylor, Louisville, Ky. As Junior, Mario Lorini, New York City.

The death of Henry A. Bentley, M. Am. Soc. C. E., on May 13th, 1889; the death of William M. Lyon, F. Am. Soc. C. E., on July 3d, 1889; and the death of William Thaw, F. Am. Soc. C. E., on August 17th, 1889, were announced by the Secretary.

The appointment, by the President, was announced of the following Members as the Committee, authorized by the meeting during the Convention, to consider and report upon a systematic revision of the Constitution and By-Laws: Messrs. Wm. P. Shinn, C. B. Brush, F. Collingwood, M. Cohen, O. E. Michaelis, C. L. Strobel and S. Whinery.

A paper on The Sibley Bridge, by Messrs. O. Chanute, John F. Wallace and Wiliam H. Breithaupt, Members of the Society, was read by the Secretary.

Mr. H. C. Miller, who recently returned from Nicaragua, gave, by request, some account of the progress of the work on the Nicaragua Canal.

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SEPTEMBER 18TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary.

The Secretary announced the death of James H. Morley, M. Am. Soc. C. E., on September 11th, 1889.

Written discussions by Messrs. George H. Pegram, C. F. Stowell, H. D. Bush, John Sterling Deans, D. J. Whittemore, J. A. L. Waddell and H. B. Seaman, on the paper on American Railroad Bridges, by Theodore Cooper, M. Am. Soc. C. E., were read by the Secretary, and the subject was further discussed by Mr. Cooper.

OF THE BOARD OF DIRECTION.

JUNE 6TH, 1889.—Applications were considered. Arrangements for the Annual Convention were made. The expediency of appointing a committee on the maintenance of the purity of domestic water-supply was discussed. A letter from the Committee of the Washington Memorial Arch was presented.

JUNE 20TH, 1889.—Final minor details as to Convention were arranged.

JULY 9TH, 1889.—Applications were considered. The resolution as to the appointment of a Committee of the Society concerning the purity of public water-supply, referred by the Convention to the Board of Direction, was considered. The resolution as to the appointment of a Committee to report to the Society a set of standard rail sections, referred by the Convention to the Board of Direction, was considered. The resolution as to the appointment of a Committee to recommend uniform methods of testing the materials used in metallic structures, referred by the Convention to the Board of Direction, was considered. Appropriations were made.

SEPTEMBER 3D, 1889.—Applications were considered. Financial business transacted.

MEMOIRS OF DECEASED MEMBERS.

ALBERT DWIGHT BRIGGS, F. Am. Soc. C. E.

DIED FEBRUARY 20TH, 1881.

Albert Dwight Briggs was born at Brattleborough, Vermont, January 25th, 1820. In 1838 he became connected with the Engineer Corps of the Western Railroad of Massachusetts, now forming a part of the Boston and Albany Railroad, and continued in that service during most of the time until 1845. He was during this period first engaged upon the Mountain Division, near Pittsfield, and afterwards assisted in making

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the first surveys for the railroad from Pittsfield to North Adams. He also was engaged in the location of the railroad from Rochester to Niagara Falls, N. Y. In 1840–41 he was specially assigned to the work of constructing the bridge over the Connecticut River, at Springfield, for the Western Railroad. In 1843–44 he was connected with the Construction and Repair Department of the same road. From 1845 to 1846 he was engaged in bridge building with William Howe, the inventor of the "Howe Patent Bridge," and with Boody, Stone & Co. and others. In 1846–47 he had charge of the construction of the Connecticut River Railroad, from Northhampton to South Deerfield. In 1847–48 he was engaged in the construction of the Cheshire Railroad. In 1848 he was connected with the Springfield Car and Locomotive Works. In 1849–50 he was in charge of the extension of the New Haven and Northhampton Railroad. In 1850 Mr. Briggs bought of William Howe the right to build bridges, roofs, etc., under his patents, and he was thereafter interested in the construction of bridges in a majority of the States of the Union.

In 1872 Mr. Briggs became a Member of the Board of Railroad Commissioners of the State of Massachusetts, and held the position until his death.

Mr. Briggs became a Fellow of the American Society of Civil Engineers in May, 1870.

MARTIN CORYELL, M. Am. Soc. C. E.*

DIED NOVEMBER 30TH, 1886.

There are few more notable examples than Martin Coryell, of that adaptability to engineering practice, of widely varying character, which was required of the pioneers of this profession in America. He came upon the field at a period when specialties were unthought of, when circumstances made him at one time a hydraulic engineer, at another a mining engineer, opening the copper mines of Michigan or the coal fields of Pennsylvania, and again reverting to canals, to railroads and to water-works. He was one of those whose names are inseparably connected with the development of the resources of this country, and with the rapid progress made in means of transportation.

Mr. Coryell was born at New Hope, Bucks County, Pennsylvania, on July 20th, 1815. His father, Lewis S. Coryell, was a prominent man in that region, and he gave him an education superior to that commonly enjoyed by the rising generation of that day. After the rudimentary course at the common school of New Hope, he was placed in the private

*Committee to prepare memoir, Mr. William P. Shinn, Director Am. Soc. C. E., and Mr. John Bogart, M. Am. Soc. C. E.

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school of Rev. Dr. Peter Studdiford at Lambertville, New Jersey, and later spent two years at a seminary in Burlington, N. J., under the instruction of John Gummere, a man of far more than local reputation as a mathematician and astronomer. Here was laid the foundation for those scientific attainments in which he afterwards achieved distinction. Failing health caused him to abandon books for a season, during which time he learned the carpenter's trade, an acquirement by no means superfluous for an engineer.

His entrance upon the profession was apparently without design. His skill in assisting Mr. Canvass White to examine the Delaware River with reference to the location of a site for the "State Dam," intended to provide a feeder for the Raritan Canal, led to Mr. White's suggestion that he should be employed by Colonel Simpson Torbert to determine the high and low water-marks of the river, and from this he passed to the position of rodman on the Delaware and Raritan Canal. After an experience of several years in different capacities, upon public works in the State of New Jersey, he was deemed competent to estimate the cost of repairs and the time necessary to restore navigation after a break which occurred in the Division Canal in the winter of 1839 and 1840. He continued in the employ of the State as Principal Assistant Engineer on the Delaware Division of the Canal until 1842, when he became Engineer in charge of the Morris Canal, which was then under the financial management of John Cryder, the representative of the English bondholders. The disaster to this enterprise, and the suspension of public works at the same time, rendered the engineering outlook so unpropitious as to induce Mr. Coryell, further persuaded by the advice of Judge John Fox, of his native town in Pennsylvania, to abandon his profession, in favor of the law. A year's study in the office of B. H. Brewster, of Philadelphia (who later became United States Attorney-General), so seriously affected his eye-sight as to end his legal aspirations. He was immediateiy engaged by the Canal Commissioners of Pennsylvania for the important task of introducing steam motive power on the West Chester Division of the Columbia Railroad, the chief difficulty to overcome being the popular prejudice then existing against it. His efforts were successful in all respects, and he remained for a considerable time in the service of the Commission as Superintendent of the Columbia Railroad from Philadelphia to the Inclined Plane.

Mr. Coryell's first connection with mining was through a survey which he was called upon to make of the underground workings of the Hazleton Coal Company's colliery. He next went to Michigan, where he figured as one of the pioneers in the exploitation of the remarkable copper deposits of that State. Returning to New Jersey in 1847, he engaged in general practice, being connected with the canals and with various railroad enterprises for the succeeding fifteen years. Prominent

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among the achievements of this period of his life were the location of the greater part of the Belvidere Railroad, under the superintendence of the late Ashbel Welch, Past President Am. Soc. C. E., and the further development of the Hazleton coal fields and the railroad which has since enlarged into the Lehigh Valley system. In 1862 he became still more closely identified with mining interests, by locating at Wilkesbarre, in the heart of the coal regions. His experience also extended to the coal fields of Kentucky, Virginia and Cape Breton, as well as to the mineral districts of the far West.

While residing at Wilkesbarre he united with R. P. Rothwell, M. Am. Soc. C. E., the present editor of the *Engineering and Mining Journal*, and others, in founding the American Institute of Mining Engineers, of which he became the first Secretary. In 1868 he joined with Messrs. Wm. J. McAlpine, James O. Morse and others in re-organizing the American Society of Civil Engineers.

Mr. Coryell returned in 1876 to Lambertville, where his public spirit manifested itself in the organization of a water company and the construction of water-works, and in other projects for the improvement of the town. He was honored and admired by all who knew him, both for the manliness, kindness of heart and ready sympathy which characterized him in all his relations with his fellows, and for the zeal and ability he displayed in the prosecution of professional work, and in the organization and conduct of business requiring a broad and comprehensive grasp of the most intricate details.

Mr. Coryell died at his home in Lambertville, N. J., November 30th, 1886, at the age of seventy-one years, mourned by all who knew him, having been a valued member of the American Society of Civil Engineers since December 4th, 1867.

EUGENE F. FALCONNET, M. Am. Soc. C. E.

DIED OCTOBER 14TH, 1887.

Major E. F. Falconnet was born in the castle of Bremgarten, on the River Arr, near the City of Berne, Switzerland, in the year 1833. The Falconnets, though of noble ancestry and connections, had lost their estates during the wars of Napoleon and the succeeding revolutions. Major Falconnet acquired his education alternately at Zurich and Geneva, taking his final degree when he was quite a lad. He came to the United States with his father in 1850. After spending some time in the Northern States, Major Falconnet went on a visit to Mexico with his

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uncle, Colonel F. Falconnet. Returning to the United States, he went to Tennessee where, in 1852, he became Assistant Engineer of the Mobile and Ohio Railroad. From 1855 to 1856 he was Resident and Division Engineer on the Mississippi Central and Tennessee Railroad; 1856–57 Principal Assistant Engineer on the South Western Railroad of Tennessee, with headquarters at McMinnville, Tenn.; 1858, Chief Engineer Wills Valley Railroad; 1859–61, Chief Engineer Nashville and North Western Railroad.

In 1860 Mr. Falconnet was appointed Sergeant-Major of the Rock City Guards. In 1861 he became a member of Rutledge Battery. This battery covered the retreat from Shiloh, Major Falconnet firing the last gun which was fired by confederates. As an officer of artillery and commander of cavalry, he served in the confederate army, during the late war, with distinction.

At the close of the war Major Falconnet resumed his professional work and was connected with the Tennessee and Pacific and the South Western Railroads, as Chief Engineer, from 1866 to 1870; afterwards Resident Engineer of Sparta Branch, Memphis and Charleston Railroad; for several years, afterward Chief Engineer, Cumberland and Ohio Railroad, from 1873–76; from 1877–79 President of Nashville and Tuscaloosa Railroad; in 1879 appointed Chief Engineer of the Owensboro and Nashville Railroad, and from that time until the date of his death prominently connected with the opening up and extension of very many of the Southern railroads, as well as many other engineering works in the Southern States.

In 1880 Major Falconnet became very much interested in aerial navigation. He made this subject a study for seven years, taking out patents on his inventions in the United States, England, Germany and France, and was preparing to build a model of his air ship at the time of his death.

Major Falconnet became a Member of the American Society of Civil Engineers, June 3d, 1874. Toward the close of the war he married Miss Burtwell, of Florence, Ala., who, with several children, survives him.

Major Falconnet was an able, painstaking and expert engineer; a man of rare gifts and of unassuming modesty; brusque in his business dealings, in personal intercourse a master of the lighter graces of society and of most charming manners. One of his most intimate personal acquaintances writes of him: "Yet variable and adventurous, and often stormy as his life has been, he was born to gentler conditions, and, except for his stern sense of duty, and an obstinate, unsoliciting modesty, his career might have been very much more brilliant, though it could not have been more honorable." He died at Nashville, Tenn., of malarial fever, greatly regretted by his widow and children, and a wide circle of friends and acquaintances.

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CHARLES LATIMER, M. Am. Soc. C. E.*

DIED MARCH 25TH, 1888.

Charles Latimer, whose death occurred in Cleveland, O., March 25th, 1888, was born in Washington, D. C., September 7th, 1827, and was, therefore, at the time of his death, in his sixty-first year. He was fond of tracing his descent from the family of Bishop Hugh Latimer, the English martyr, after whom he named his eldest son, and whom he certainly resembled much in character, if the connection was not very direct.

At the age of fourteen Mr. Latimer was appointed a midshipman and entered the United States Naval Academy at Annapolis, from which he graduated, with credit, well up in his class; remaining in the Government naval service some thirteen years in all, one year of which was passed as Assistant Professor at the Naval Academy, and the remainder chiefly in sea service. He then resigned, and for a time served as an officer on a Mississippi River steamboat. His long and honorable career of railway service began in 1854, when he was twenty-seven years old, and for three years he was successively rodman, leveler, transitman and Assistant Engineer on the Mobile and Ohio and Mississippi Central and Tennessee Railroads. From 1857 to 1861 he was again engaged in steamboat service for the Mobile and Ohio Railroad, connecting that road with the Illinois Central.

When the war broke out, although Mr. Latimer was of southern parentage and residence, he did not waver a moment in his allegiance, but became a vehement Union man, and immediately entered the Government service in the field where he was deemed most useful, as Assistant Engineer in the United States Military Railway service. Here he was at once engaged in rebuilding and maintaining various roads in Kentucky and Tennessee, ending his service with Colonel Wright in Chattanooga in 1864–65. His military service, while full of interest and successful exertion, was not particularly brilliant in incidents; but in connection with his previous experience as a naval officer it undoubtedly laid the foundation for Mr. Latimer's most remarkable trait, his notable executive ability in the selection and management of men.

After the war Mr. Latimer returned for a short time to steamboat service, commanding one of the boats on the line above mentioned, but in 1867 he returned to engineering work on the St. Louis, Vandalia and Terre Haute and Dixon, Peoria and Hannibal Railroad (now of the Chicago, Baltimore and Quincy system), of which he was Principal Assistant Engineer.

* Committee to prepare memoir, Mr. A. M. Wellington, M. Am. Soc. C. E.

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In 1871 he became Principal Assistant Engineer of the Chicago and Michigan Lake Shore Railroad, and in the following year the company recognized his ability by appointing him Chief Engineer. Later, Mr. Latimer accepted a position as Principal Assistant Engineer on the extension of the Hannibal and St. Joseph Railroad, and was thus employed for six months, when he became connected with the Atlantic and Great Western, since known as the New York, Pennsylvania and Ohio Railroad, which is now a part of the Erie system. This was January 1st, 1873. For two months he was Assistant Engineer, for fifteen months Assistant Chief Engineer, and in 1874 he was chosen Chief Engineer, which position he held constantly until March, 1886, when the consolidation of the road with the Erie, and a change of management, led to his resignation.

The position of Consulting Engineer, or engineer for the lessor company, was then tendered him, and he held it to the day of his death, engaging likewise in various consulting work. It was a desirable office for the company to have, but it was, beyond doubt, created more in recognition of Mr. Latimer's past services and in view of his intimate personal knowledge of the road than from the idea that it was inherently desirable if filled in ordinary fashion.

Mr. Latimer became a Member of the American Society of Civil Engineers April 5th, 1876, and was, in 1887, President of the Civil Engineers' Club of Cleveland, in which organization, as in everything for the advancement of his profession, he took a great interest. He married in 1866 a Miss Lombard, of Illinois, a woman of many noble qualities, and a true, devoted and unselfish wife, who died in 1875, leaving four children, three daughters and one son, who also survived Mr. Latimer.

The work on which Mr. Latimer's reputation as an engineer will chiefly rest, was his long and successful conduct of the Engineering Department of the New York, Pennsylvania and Ohio Railroad. That department was organized in a somewhat unusual way. The Chief Engineer not only had full control of engineering work proper, but of the track department and track force as well, reporting only to the President, thus giving him very unusual power and responsibility. When Mr. Latimer began his duties, the road had been for years in complicated financial difficulties, as it continued to be during most of his administration. As a consequence the track was at first in very bad condition. Mr. Latimer took hold of the work with characteristic energy; organized his department with great care; began at once the system of exciting the personal interest and emulation of employees which continued throughout his management, and as a final result, when his chief engineership closed, he was able to show a track the equal of any road in the West, obtained by very moderate annual expenditures, and with the proud record that in his whole tenure of office not a single

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passenger had lost his life or been seriously injured from accidents due to defects of track.

The result alone was something to be proud of, but even more interesting than the result was the manner in which it was obtained. Intensely interested in the work himself and strongly sympathetic in his nature, he early established between himself and his subordinates, high and low, the relation of friend and fellow-laborer rather than that of master and servant. Annual "Roadmasters' Meetings" were established early and continued during his administration, at which every question of track administration was discussed frankly, and suggestions were always welcomed and duly weighed. A regular system of inspections was also established on this road among the first. No money prizes were awarded, for Mr. Latimer would not countenance the idea that the men needed it to stimulate their fidelity, but praise and blame was carefully and equitably distributed. The same general system of management naturally permeated down through the force into the lower grades. The result was that friendly rivalry and *esprit de corps* were greatly stimulated, and each man had to a great extent the advantage of the united intelligence of the whole force in conducting his work, as well as the feeling that any slackness would be noticed and commented on.

Perhaps Mr. Latimer's greatest single service to engineering was the invention, in 1871, of the re-railing guard which bears his name, which is now almost universally approved. The first one of these was put in at the St. Joseph River bridge, on the Chicago and Michigan Lake Shore Road, of which Mr. Latimer was Chief Engineer, and within two years thereafter saved two passenger trains from wreck. The elements of this invention were not new; in fact, had so little novelty that patent was refused on them, but none the less Mr. Latimer deserved the credit of developing heretofore crude and imperfect forms into a perfect and satisfactory device.

Mr. Latimer was known outside of his profession more by two particular beliefs of his than as a civil engineer, viz., by his belief in the "divining rod," and by his vehement advocacy of the divine origin, in the pyramid of Cheops, of the Anglo-Saxon weights and measures. It is to be feared that these two personal idiosyncrasies, which to many seemed a belief in mere absurdities, led engineers who did not believe in them to do scant praise to Mr. Latimer's sterling qualities and really great abilities as an engineer and manager, and to forget during his life the homage due to a nobility of character, a generosity of spirit, and a purity and unselfishness of life which was more than admirable, and which will be long and tenderly remembered by those who had the good fortune to know him intimately. A more entirely unselfish man, perhaps, never lived, nor one who was less stimulated by mere personal ambition. Had he been more so, his professional career would undoubt-

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edly have been even more successful; but he would hardly have left behind him in as great measure what would have been far more precious in his sight, the affectionate remembrance and good will of all who knew him, from the lowest trackman to the late Chief Justice of the United States. He was by no means slack in discipline, and could easily be stern upon occasion, but he was invariably just, and hence it is doubtful if he had, or ever had, an enemy in the world.

It was Mr. Latimer's habit for years to have family prayers night and morning, and his death was consistent with his life in that he was stricken with apoplexy on his knees, after his morning prayers. Beyond a few incoherent words, after he had been helped to his bed, he never spoke again, and he lived but a few hours. Could he have foreseen the stroke, he would have been the first to say: "It is well," nor is it likely that his composure would have been disturbed for a moment.

His funeral was a remarkable evidence of the universal respect and regard in which he was held. Six of his old roadmasters acted as pall-bearers: Messrs. M. J. McInarna, P. Bowen, P. Collopy, E. Collopy, T. G. Armstrong and J. Haller, and undoubtedly he had no truer mourners. Twenty civil engineers acted as honorary pall-bearers and escort, and the church was crowded with high and low of Cleveland—a Sunday-school class of a dozen Chinamen, whom Mr. Latimer had taught for years, and who sent in one of the finest floral tributes, being especially conspicuous.

"A life of honor and of worth hath no eternity on earth; 'tis but a name," and the memory of Mr. Latimer, with that of many others less worthy, will gradually fade away, but it can hardly be while any yet remain who knew him intimately. He was not only an engineer of marked ability, but as nearly as it is often given to men to be, a man without guile and without sin.

HENRY FRANCIS WALLING, M. Am. Soc. C. E.*

DIED APRIL 8TH, 1888.

Henry Francis Walling died April 8th, 1888, at his home in Cambridge, after a brief illness, of heart disease. He was born in Burrillville, R. I., June 11th, 1825. He was educated in the public schools of Providence, where his father carried on a mercantile business for many years. He is remembered as a sober, thoughtful pupil, with a mind constantly at work, and, in mathematics especially, excelling without effort; he was disposed to experiment for himself, rather than accept the solutions of others—a trait which distinguished him through life.

*Committee to prepare memoir, Mr. Thomas Doane, M. Am. Soc. C. E., and Mr. Frank O. Whitney, M. Am. Soc. C. E.

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After graduation from the public schools he fitted himself for a university education at the school of Thomas C. Hartshorn, and at Lyon and Frieze's, but on account of his early marriage did not enter college.

He married Miss Maria Fowler Wheeler in 1847.

The issues of this marriage were a son of great promise, who died while in Yale College, and two daughters, who, with their mother, survive him.

Mr. Walling for a long time was occupied in teaching an evening drawing school, and as Assistant Librarian of the Providence Athenæum. He early became a partner with the late Samuel Barrett Cushing, M. Am. Soc. C. E., and entered upon the business of map-making, commencing with that of Northbridge, Mass.

In 1858 he left Providence and went to New York, where he established his business on a much larger scale, and was very successful until 1861, when it was ruined by the breaking out of the civil war.

In March, 1868, Mr. Walling accepted the Chair of Civil and Topographical Engineering in the Pardee Scientific School of Lafayette College, at Easton, Pa. After three years he resigned his professorship, and, moving to Boston, entered once more upon the business of map-making.

The last few years of his life were spent upon the United States Geological Survey, and at the time of his death he was engaged, with others, in making an extensive and accurate map of Massachusetts, which the Government is now publishing. Mr. Walling prepared and published maps of over twenty states and provinces, two hundred and eighty counties and one hundred cities and special localities. He became a Member of the American Society of Civil Engineers May 6th, 1868, and was an active and respected member of the Society. During his life he contributed several papers to its Transactions. He was a member of the Local Committees at the Boston and Washington Conventions.

Professor Walling had the love and respect of all who knew him; hospitable and sociable at his own home and eminently companionable among his scientific associates, he was notably kind and patient with his assistants and employees. He never made an enemy and left a friend in every one who knew him.

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WILLIAM S. BARBOUR, M. Am. Soc. C. E.

DIED FEBRUARY 24TH, 1889.

William S. Barbour was born in Boston, Mass., December 1st, 1834. His parents removed to Cambridge when he was still young and his home was always afterwards in that city. He was educated at the Cambridge High School and at the Lawrence Scientific School, and afterwards studied in the office of W. Mason, C. E., with whom he entered into partnership about the year 1856.

Subsequently he became connected with the construction of street railways, and in 1876 was elected City Engineer of Cambridge, holding that office at the time of his death. During his services as City Engineer, to which he was annually re-elected, many important and intricate problems of city work were presented and solved by him, including a study of the sewerage of the city.

At the time of his death the Mayor and City Council of the City of Cambridge expressed their appreciation of the services rendered to the city by Mr. Barbour, both by formal resolutions and by speeches referring to many details of those services.

Mr. Barbour became a Member of this Society April 17th, 1872, and was always greatly interested in the elevation of the profession.

Mr. Barbour was married in 1862 to Miss Julia Battis of Roxbury, who, with two sons, survives him.

The faithful prosecution of the duties of a City Engineer involves the study and application of many and varied engineering problems, and successful work in such an office is an essential element in the comfort and prosperity of a city. The thorough approval by the citizens of Cambridge of the work of a man, modest and retiring as Mr. Barbour was, shows that the duties of this important office were always well performed.

CHARLES C. SMITH, M. Am. Soc. C. E.

DIED APRIL 17TH, 1889.

Colonel Charles C. Smith was born at Niagara Falls in the year 1830, and was the only son of Major C. H. Smith. In 1850 he went with Major Barnard to Mexico, with the Government expedition, to survey the Isthmus of Tehuantepec. On his return from this expedition he applied himself to the practice of his profession, and was connected with various railroads in Massachusetts, Ohio, Indiana, Minnesota and Kansas until his retirement from active business in 1888.

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At the breaking out of the late civil war Colonel Smith entered the volunteer service, with the rank of Captain, serving with his regiment, the 2d Ohio Cavalry, until February, 1863, when he was commissioned Colonel of the 10th Ohio Cavalry, which he commanded until 1864, when he was assigned to duty as commander of the 2d Brigade, 3d Division, Cavalry Corps, under General Judson Kilpatrick.

Colonel Smith organized the 10th Ohio Cavalry, which went through the campaigns of middle and east Tennessee, Georgia, North and South Carolina, and was prominent in most of the engagements and battles of these campaigns. The perfect discipline and splendid fighting qualities of this regiment won for it the distinction of Kilpatrick's favorite sabre charging regiment. In the early part of 1865 Colonel Smith's health had become so impaired that he could no longer remain in the army.

Colonel Smith's military service extended through the greater portion of the period of the Civil War, and was brilliant and important in the extreme. Of this period of his life one of his friends says: "As a tactician and disciplinarian he had no superior. He possessed courage, coolness, quiet power and the tact for organizing and holding large forces of men in thorough subordination, and the spirit to imbue them with soldierly enthusiasm."

On his return to his home he resumed his work in connection with the construction of railroads, designing, while Chief Engineer of the St. Paul, Minneapolis and Manitoba road, the stone viaduct across the Mississippi at Minneapolis, which was his last and greatest engineering feat.

Colonel Smith became a Member of the American Society of Civil Engineers July 10th, 1872.

In December, 1888, he made an extended tour through Europe with Mrs. Smith, returning to the United States in April, 1889. He died at Norwalk, Ohio, on April 17th, a few days after his return from Europe, deeply regretted by a large circle of personal and professional friends.

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MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

OCTOBER 2d, 1889.—The Society met at 20 o'clock. Vice-President A. Fteley in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates declared elected. As Members: William Augustine Aiken, Mt. Vernon, O.; Ward Baldwin, Cincinnati, O.; Sumner Homer Bodfish, Washington, D. C.; Bernard Richardson Green, Washington, D. C.; Ellis Bradford Noyes, Fort Edward, N. Y.; Charles Olmstead Parker, Macon, Ga.; John Curtis Patterson, Poughkeepsie, N. Y.; Olaf Ridley Pihl, Cascade Locks, Ore.; Anderson Harvey Tyson, Reading, Pa.; Alva Morgan Van Auken, Denver, Colo. As Juniors: Friedrich Rosenberg, Jersey City, N. J.; William White Seitzinger, Tarrytown, N. Y.

Ballots were canvassed on the following resolutions:

Whereas, It is a well-known fact that many cities and towns on the Atlantic Coast have suffered very greatly from impurities in their water supplies, due to various causes, and that no adequate remedy, meeting all conditions, has been found therefor; and, *Whereas*, these impurities are often due to natural causes, which have not been adequately investigated on account of the difficulty of centralizing the individual efforts of all parties engaged in said investigations,

Resolved, That a committee of three members of this Society be appointed by the President, to ascertain the best means of concentrating all obtainable information in such a manner as to secure useful results and to report to the annual meeting of this Society what further action, in their opinion, should be taken in the premises.

On this resolution there were 235 affirmative and 19 negative votes. This resolution was declared adopted.

Resolved, That a committee be appointed by the Board of Direction to be authorized and instructed to report to the Society a set of standard rail sections of weights, beginning at 40 pounds, and advancing by increments of 5 to 100 pounds per lineal yard.

On this resolution there were 218 affirmative and 35 negative votes. This resolution was declared adopted.

Resolved, That a committee of seven members of the Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures.

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On this resolution there were 257 affirmative and 7 negative votes. The resolution was declared adopted.

Resolved, That the same committee be requested to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

On this resolution there were 168 affirmative and 82 negative votes. The resolution was declared adopted.

A paper on Experiments Relating to Hydraulics of Fire Streams, by John R. Freeman, M. Am. Soc. C. E., was read by the author and discussed by Messrs. Weston and Merriman.

OCTOBER 16TH, 1889.—The Society met at 20 o'clock. J. J. R. Croes, M. Am. Soc. C. E., in the chair; John Bogart, Secretary.

The presentation by Mr. Frederick Ewart Robertson, Assoc. M. Inst. C. E., of an album of photographs, with description of the Sukkur Bridge in India, was announced by the Secretary.

A paper by J. B. Johnson, M. Am. Soc. C. E., on "Cast-Iron—Strength, Resilience, Tests and Specifications," was read by the Secretary and discussed by Messrs. Just and Berg.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AIKEN, WILLIAM AUGUSTINE	Chief Engineer Mt. Vernon Bridge Co., Mt. Vernon, Ohio.	Oct. 2, 1889
BALDWIN, WARD	(Elected Junior March 2, 1881). Assistant Engineer in charge of office, Cincinnati, New Orleans and Texas Pacific Ry, 35 West Fourth st., Cincinnati, Ohio	Oct. 2, 1889
BODFISH, SUMNER HOMER	Colorado Springs, Col.	Oct. 2, 1889
GREEN, BERNARD RICHARDSON	1738 N st., Washington, D. C.	Oct. 2, 1889
NOYES, ELLIS BRADFORD	(Elected Junior July 7, 1880). Assistant Engineer in charge, Fort Edward, N. Y.	Oct. 2, 1889
PARKER, CHARLES OLMSTEAD	Assistant General Manager Jacksonville, Tampa and Key West R. R. System, Jacksonville, Fla.	Oct. 2, 1889
PIHL, OLAF RIDLEY	Cascade Locks, Oregon	Oct. 2, 1889

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TAYLOR, BUSHROD WILBER.....Engineer Main. of Way Jeffersonville, Madison and Indianapolis Div. Penn. Lines west of Pittsburgh, Louisville, Ky. Sept. 4, 1889
TYSON, ANDERSON HARVEY.....526 Court st., Reading, Pa ... Oct. 2, 1889
WHITE, TIMOTHY SIDNEY.....President and Chief Engineer Penn. Bridge Co., Beaver Falls, Pa.....April 3, 1889

JUNIORS.

CORNELL, JOHN NELSON HAYWARD..(Care Aqueduct Commission), Yonkers, N. Y..... May 1, 1889
LATHAM, NORMAN SMITH.....724 President st., Brooklyn, N. Y..... July 3, 1889
SEITZINGER, WILLIAM WHITE.....P. O. Box 88, Tarrytown, N. Y. Oct. 2, 1889

CHANGES AND CORRECTIONS.

MEMBERS.

BEAHAN, WILLARD.....(Care Union Bridge Co.), 1 Broadway, New York City.
BLACKWELL, CHARLES.....Assistant Superintendent Toledo, St. Louis and Kansas City R. R., Frankfort, Ind.
BLAND, JOHN C.....Consulting Engineer, Colorado Springs, Col.
DAGRON, JAMES G.....Engineer of Bridges Baltimore and Ohio R. R., Baltimore, Md.
DOANE, WALTER A.....Principal Assistant Engineer Norfolk and Western R. R., Roanoke, Va.
EARLEY, JOHN E.....Tehuacan, Puebla, Mexico.
FORSYTH, ROBERT.....Engineer Illinois Steel Co., 1035 Rookery, Chicago, Ill.
FULTON, JOHN A.....Bridge Engineer Lake Shore and Michigan Southern Ry., Cleveland, Ohio.
HAVEN, WILLIAM A.....Helena, Montana.
HODGES, ARTHUR.....Chief Engineer West End Street Ry, 81 Milk Street, Boston, Mass.
JENKINS, WILLIAM D.....Chief Engineer New Orleans, Natchez and Ft. Scott Ry, Natchez, Miss.
MORRIS, S. FISHER .....467 West Twenty-third st., New York City.
ODELL, FREDERICK S.....32 South Fifteenth ave., Mount Vernon, New York.
RAYMOND, CHARLES WARD.....Manager Merrimac Mining Co., Platora, Conejos Co., Col.
SANDERSON, J. GARDNER.....Kingston, N. Y.
SCHMIDT, MAX O. E.....527 North State st., Chicago, Ill.

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TALCOTT, E. N. KIRK.....6730 Lafayette ave., Englewood, Ill.
THACHER, EDWIN.....258 West Main st., Louisville, Ky.
VANCE, HART.....Cheshire, Gallia Co., Ohio.
WILLIAMSON, WM. GARNETT.....(Williamson & Earl, Civil Engineers), Montgomery, Ala.
WROTNOWSKI, ARTHUR F.....Atlantic City, N. J.

JUNIORS.

BENSEL, JOHN A.....Assistant Engineer Department of Docks, 64 East Seventy-ninth st., New York City.
FARGUSSON, MARK.....Southport, N. C.
MCCORMICK, GEORGE K.....Resident Engineer Louisville and Nashville R. R., Dryden, Lee Co., Va.
POLLEDO, YSIDORO.....Manager "Sta Barbara" Sugar Works, Apartado 167, Matanzas, Cuba.
ROSENWEIG, ALFRED.....Manager "La Mexicana" Land and Mining Co., and California Land Co. of Mexico (Ltd), La Paz, Baja California, Mexico.

RESIGNATION.

JUNIOR.	Date of Resignation.
SHEPARD, WILLIAM T.....	Sept. 4, 1889

DEATH.

MORLEY, JAMES H.....Elected Member, Oct. 6, 1886; died Sept. 11, 1889.

ADDITIONS TO LIBRARY AND MUSEUM.

From American Institute of Mining Engineers, Dr. R. W. Raymond, Secretary, New York City:

Ore—Deposits of the Black Hills of Dakota. Franklin R. Carpenter.
Proceedings of the Fifty-third (Nineteenth Annual) Meeting, New York City, February, 1889.
The Geology of Buffalo as Related to Natural Gas Explorations along the Niagara River. Charles Albert Ashburner.
The Copper Deposits of Copper Basin, Arizona, and their Origin. William P. Blake.
An Automatic Dumping Cradle for Mine Cars. H. S. Munroe.
Notes on the Electrolytic Assay of Copper. William Glenn.
The Determination of Silicon in Ferro-Silicons; Its Occurrence in Aluminum as Graphitoidal Silicon: and a Study of its Reactions with Alkaline Carbonates. Henry J. Williams.
The Influence of Silicon in Cast-Iron. H. S. Fleming, W. J. Keep and Edward Orton, Jr.
A Rapid Method for the Determination of Phosphorus in Certain Ores. T. Reed Woodbridge.
The Concentration of Iron Ore. John Birkinbine and Thomas A. Edison.
Note on the Koepe System of Winding from Shafts. John H. Harden.
A Review of the Iron Mining Industry of New York for the Past Decade. John C. Smock.
Supplementary Note on Blast Furnace Lines. Edward Walsh, Jr.
The Desulphurization of Pyritiferous Iron Ores. Sterling G. Valentine.
Coal Versus Oil in the Puddling Furnace and in Raising Steam. G. H. Billings.
An Automatic Dumping Cradle; Discussion. H. S. Munroe.
Some Thoughts Relating to the American Institute of Mining Engineers and its Mission. E. C. Potter.
Steel Rails and Specifications for their Manufacture; Discussion. Robert W. Hunt.
Note upon some Results of the Storage of Water in Arizona. William P. Blake.

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Nails from Tin-Scrap. Oberlin Smith.
The Neustrom Magnetic Separator. Robert Anderson Cook:
The Present Status of Electric Transmission of Power. Richard P. Rothwell.
Tuyere Slagging-Valve. Edgar S. Cook.
Gold-Milling in the Black Hills. H. O. Hofman.
A Rapid Method for the Reduction of Ferric Sulphate in Volumetric Analysis. Clemens Jones.
A Present Need in the Engineering Profession. William B. Potter.
Hollow Iron Pig-Patterns. B. F Fackenthal.
Rail Sections. Frederic A. Delano.
Pig Iron of Unusual Strength. Fred. P. Dewey.
Soaping Geysers. Arnold Hague.
The Occurrence and Treatment of the Argentiferous Manganese Ores of Tombstone District, Arizona. Charles W. Goodale.
Note on the Nickel Ore, Russell Springs, Logan County, Kansas. Fred. P. Dewey.
The Distribution of Phosphorus in the Ludington Mine, Iron Mountain, Michigan; A Study in Irochemic Lines. David H. Browne.
The New Dressing Works of the St. Joseph Lead Company, at Boune Tene, Missouri. H. S. Munroe.
The English versus the Continental System of Jigging; Is Cloro-Sizing Advantageous? H. S. Munroe.
Notes on the Bernice Anthracite Coal Basin, Sullivan County, Pa. Clarence R. Claghorn.
Note on the Influence of Columbite Upon the Tin-Assay. Franklin R. Carpenter.
A Note Upon the Modification of the Reducing Process Used by the Carbon Iron Company. Alfred E. Hunt.
A New System for Operating Regenerative Hot Blast Stoves. Jacob T. Wainwright.
Prominent Sources of Iron Ore Supply. John Birkinbine.
Catalogue of Officers, Members, Rules, etc., to June 1st, 1889.
Coal Transfer of the Mt. Carbon Company, Limited. W. N. Page.
An Occurrence of Copper Glance North of Lake Huron, with Notes on the Structure of the Locality. James T. B. Ives.
Note on the use of Crude Petroleum as Fuel for Raising Steam at the South Chicago Works. E. C. Potter.
Progress of Metallurgical Science in the West. Richard Pearce.
The Re-opening of the Tilly Foster Iron Mine. F. H. McDowell.
Proposed Rail Sections. Robert W. Hunt.
An Improved French Pocket Compass. R. A. Bergier.
Notes on the Manufacture of Open-Hearth Bridge Steel. N. W. Shea.
Oil as a Metallurgical Fuel. E. C. Felton.
Proceedings of the Fifty-fourth Meeting, Colorado, June, 1889.
End Lines and Side Lines in the U. S. Mining Law. R. W. Raymond.
The Dry Assay of Tin Ores. H. C. Hofman.

From Aqueduct Commissioners, New York City:

Reports on Researches Concerning the Design and Construction of High Masonry Dams, in View of the Proposed Building of Quaker Bridge Dam.

From Frank M. Ashmead, Pittsburgh, Pa.:

Annual Reports of the Allegheny Valley Railroad for the years 1877–81–82–83–84–85–86–87 and 88.

From Carrol Ph. Bassett, Newark, N. J.:

Report of Carrol Phillips Bassett submitted with General Plan for a System of Sewerage for the City of Reading, with a Discussion of the Sanitary Needs of the City and of Sewage Disposal.

From Onward Bates, Milwaukee, Wisconsin:

Six Plans, as follows:
Standard Wooden Culverts, C. M. and St. P. Ry.
Standard Pile and Frame Bents.
Standard Frame Bent Trestle.
Standard Pipe Culverts.
Standard Pile Bent Trestle.
Standard Cattle Guard.

From Bates & Kimball, Boston, Mass.:

Technology Architectural Review. Vol. I, No. 8; Vol. II, No. 8. 1889.

From James G. Blaine, Secretary of State, Washington, D. C.:

Reports of the United States Commissioners to the Paris Universal Exposition, 1878. Vols. I, II, III, IV, V.
Proceedings of the International Sanitary Conference provided for by Joint Resolution of the Senate and House of Representatives in the early part of 1881.
Papers relating to The Foreign Relations of the United States for the year 1872, Vol. I, Part 2; Vol. II, Part 2; Vol. III, Part 2; Vol. IV, Part 2; Vol. V, Part 2.
International Monetary Conference, held in Compliance with the Invitation extended to certain Governments of Europe by the Government of the United States, in pursuance of the Second Section of the Act of Congress of February 28th, 1878, in Paris, in August, 1878, under the Auspices of the Ministry of Foreign Affairs of the Republic of France.
Reports upon the Survey of the Boundary between the Territory of the United States and the Possessions of Great Britain, from the Lake of the Woods, to the Summit of the Rocky Mountains, authorized by an Act of Congress approved March 19th, 1872, with accompanying Maps.
Report of the Electrical Conference at Philadelphia in September, 1884.
Commercial Relations of the United States with Foreign Countries during the years 1882 and 1883, Vols. I and II.
Report upon the Commercial Relations of the United States with Foreign Countries for the years 1874–76–77–80–81.

From Max J. Becker, Pittsburgh, Pa.:

Report of the Tenth Census of the United States, Vol. VII, 1880.

From Brigadier-General S. V. Bénet, Chief of Ordinance, U. S. Army, Washington, D. C.:

Annual Report of the Chief of Ordnance to the Secretary of War for the fiscal year ended June 30th, 1888.
Ordnance Notes No. 48, on Steel Wire Guns. Lieutenant G. Moch.
Ordnance Notes No. 49, on the Rifling of Guns. Lieutenant William Crozier.

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Ordnance Notes No. 50, on The Physical Properties of Iron and Steel at Higher Temperatures. James E. Howard.

From G. H. Benzenberg, Milwaukee, Wis.:

Annual Report of the Board of Public Works of the City of Milwaukee, Wisconsin, for the year 1888.

Report of the Commission of Engineers on the Collection and Final Disposal of the Sewage and on the Water Supply of the City of Milwaukee, Wisconsin, 1889.

From Ar. P. Blanchet, New York City:

Comparaison entre Nicaragua, Panama and Suez Pour faire suite à la brochure "La Lumière sur Panama." Par Ar. P. Blanchet, Paris, 1887.

Analyse et Critique du Rapport lu par M. Ferdinand de Lesseps a L'Assemblée Générale des Actionnaires de la Compagnie du Canal le 29 Juin, 1882.

Two Photographs "Canal Interoceanique de Nicaragua."

From the Board of Railroad Commissioners of Iowa. W. W. Ainsworth, Secretary, Des Moines, Iowa.

Eleventh Annual Report of the Board of Railroad Commissioners for the year ending June 30th, 1888.

From Boston Public Library, Boston, Mass.:

Thirty-seventh Annual Report of the Trustees of the Public Library of Boston, Massachusetts, for the year 1888.

Supplement to Thirty-seventh Annual Report of the Trustees of the Public Library of Boston, Massachusetts, for the year 1889.

From Brandis Mfg. Co., New York City:

The Aneroid Barometer; its Various Forms; its Theory and its Use, with Special Reference to the Determination of Altitudes. E. A. Gieseler, New York, 1889.

From Harold P. Brown, New York City:

Electrical Distribution of Heat, Light and Power. Harold P. Brown, New York City, 1889. With Partial list of Deaths from Electrical Lighting Apparatus, and Address by John Murray Mitchell, Counselor at Law, on Legislative Control of Dangerous Electrical Currents.

From Buffalo Merchants' Exchange, William Thurstone, Secretary, Buffalo, N. Y.:

Annual Report of the Buffalo Merchants' Exchange, including Statistics of the Trade and Commerce of Buffalo, 1889.

From Bureau of Education, Washington, D. C.:

No. 3. The History of Education in North Carolina. Charles Lee Smith.

No. 4. History of Higher Education in South Carolina, with a sketch of the Free School System. Colyer Meriwether.

No. 5. Education in Georgia. Charles Edgeworth Jones.

No. 6. History of Education in Florida. George Gary Resh.

No 7. Higher Education in Wisconsin. William F. Allen and David E. Spencer.

Proceedings of the Department of Superintendence of the National Educational Association at its meeting in Washington, February 14-16, 1888.

From Bureau of Navigation, Navy Department, Washington, D. C.:

Pilot Charts of the North Atlantic Ocean for March to August, 1889, inclusive.

From Bureau of Statistics, Washington, D. C.:

Reports from the Consuls of the United States N. S. January to May, 1889.

Contents and Index to Vol. XXIX of Reports from the Consuls of the United States, Nos. 101 to 104, months January to April, 1889, inclusive.

Maps showing the location of the Diplomatic and Consular Offices of the United States of America. March 1st, 1888.

Annual Report of the Chief of the Bureau of Statistics on the Foreign Commerce of the United States for the year ending June 30th, 1888.

Annual Report and Statements of the Chief of the Bureau of Statistics on the Foreign Commerce and Navigation, Immigration and Tonnage of the United States for the fiscal year ending June 30th, 1888.

From California Academy of Sciences, F. Gutzkow, Secretary, San Francisco, Cal.:

Proceedings of the California Academy of Sciences, Vol. I, Part 1, June, 1888; Vol. I, Part 2, April, 1889.

Memoirs of the California Academy of Sciences, Vol. II, No. 2.

From Frank A. Calkins, New York City:

Papers on Practical Engineering.

Atlas accompanying Vol. III on Mining Industry.

Annual Report of the Canal Commissioners of the State of New York, transmitted to the Legislature January 5th, 1875.

Engravings of Plans, Profiles and Maps illustrating the Standard Models from which are built the Important Structures of the New York State Canals, accompanying the Annual Report of the State Engineer and Surveyor on the Canals for 1859.

To the Friends of Rapid City Transit:

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For Furnishing one Snag Boat and one Tow Boat.
For Furnishing and Placing Stone on Breakwater at Bar Harbor, Maine.
For Furnishing Drilling Barge, and one Dumping Flat.
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For Furnishing Cast-iron Water Pipes and Castings for Water Supply, District of Columbia.
For Stone and Brush Training Walls, and Jetties, Kennebec River, Maine.
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For Timber for La Grange Dam on Illinois River.
For Improving Cossica Creek, Maryland.
For Improving Broad Creek from its mouth to Laurel, Delaware.
For Improving Nansemond River, Virginia.
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For Constructing Dike and Dredging in Flushing Bay, New York.
For Constructing Breakwater at Marquette, Michigan.
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For Stone.
For Removing the Wreck of the Barge "Amicus" from Pamunky River, Virginia.
For Repairs of West Pier at Dunkirk Harbor, N. Y.
For Depositing Stone on the Jetties at Harbor of Charleston, S. C.
For Furnishing and Placing Riprap Granite in the North Wall of the Inner Harbor at Block Island, R. I.
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For Removing Wreck of Schooner "Alma."
For Furnishing and Placing Stone on the Breakwater at the mouth of Saco River, Maine.
For Repairs and Renewals at Fort Carroll, Md.
For Repairs at Fort McHenry, Baltimore, Md.
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For Dam No. 8, Monongahela River.
For Improving Maurice River, N. J.
For Furnishing Stone for Use at the Des Moines Rapids Canal.
For Improving Susquehanna River, Md.
For Construction of Breakwater at Mouth of the Housatonic River, Conn.
For Lock on Muskingum River.
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For Hydraulic Cement.
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For Lake Providence Reach.
For Removal of Wreck of Steamship "Atlas," in Hudson River, near Barclay Street, New York City.
For Brush.
For Improvement of Tillamook Bay and Bar, Oregon.
For Removal of Wreck in Pataposee River.
For Removal of Wreck in English Creek, New Jersey.
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For Water Supply, District of Columbia.
For Building Snagboat.
For Furnishing Steam Barge at Erie Harbor, Pa.
For Furnishing Tug, Scows and Dump Scows at Erie Harbor, Pa.
For Dike at Red Bank Creek, Allegheny River.
For Removing Overhanging Trees, Logs, Snags and Boulders from Mississippi River, between Aitken and Grand Rapids, Minn.
For Constructing Dikes and Mattresses for Rappahannock River, Va.
For Cement for Beattyville Lock, Kentucky River, Kentucky.
For Construction of Keepers' Dwellings at Locks Nos. 3, 4 and 5, Kentucky River, Kentucky.
For Excavating a Lock Pit at St. Mary's Falls, Canal, Mich.
For Depositing Stone on the Jetties at Harbor of Charleston, S. C.
For Removing Bar at Mouth of Licking River.
For Improving Harlem River, N. Y.
For Improving the Channel between Staten Island and New Jersey.

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For Improving Harbor at Wilmington, Del.
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For Rock Excavation.
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For Improving Trinity River, Texas.
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For Constructing Dike at Winyaw Bay, S. C,
For Repairing Dikes at Rondout Harbor, N. Y.
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For Building a Pile and Crib Dike at Saugerties Harbor, New York.
For Removing wreck of Schooner *Annie E. Hayes*
For Building one Lighter for James River, Va.
For Constructing Dikes and Mattresses in Mattapan River, Va.
For Building a Dump Boat for Great Kanawha River Improvement.
For Dimension and Backing Stone.
For Constructing Dump Scows.
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For Superstructure of Pier, Milwaukee Harbor, Wis.
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For Sea Wall on Governor's Island, New York Harbor.
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For Sea Wall at David's Island, New York Harbor.
For Hire of Dredging Plant for Improving Connecticut River, Conn.
For Hire of Dredging Plant for Improving Housatonic River, Conn.
For Hire of Dredging Plant for Improving Harbor at Five Mile River, Conn.
For Dredging in Sheepshead Bay, N. Y.
For Dredging at Great Sodus Bay, N. Y,
For Dredging in Black Rock Harbor, Conn.
For Dredging in Bellamy River, New Hampshire.
For Dredging in Penobscot River, Maine, between Bangor and Crosby's Narrows.
For Dredging Pamunky River, Va.
For Dredging in Penobscot River, Maine, between Bucksport and Winterport.
For Dredging in Apalachicola Bay, Fla.
For Dredging between the Jetties at Harbor of Charleston, S. C.
For Dredging in Channel leading to Harbor at Baltimore, Md.
For Dredging in Harbor at Back Cove, Portland Harbor, Maine.
For Dredging and Removing Ledge in York Harbor, Maine.
For Dredging and Constructing Spur Dikes, Rappahannock River, Va.
For Dredging Chickahominy River, Va.
For Dredging in Saugerties Harbor, N. Y.
For Dredging Mouth of Black River, Mich.
For Dredging in Block Island Harbor, R. I.
For Dredging at Hyannis, Wareham and New Bedford Harbor, Mass.; Newport Harbor, R. I.; Pawtucket, Providence and Paucatuck rivers, R. I., and Green Jacket Shore, Providence Harbor, R. I.
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Stress Diagrams of Solid Structures. Robert Henry Smith.

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The District Distribution of Steam in the United States. Dr. Charles Edward Emery.

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The Kunstadter Patent Screw Steering and Propelling Device.

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One Phototype showing exact Heights of the Structure itself, and relative Heights of various prominent Edifices in the World.

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The Street Pavements of New York.

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Annual Reports of the Board of Directors of the Lake Shore and Michigan Southern Railway Company for the fiscal year ending December 31st, 1886-87-88.

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Professional Biography of Moncure Robinson.

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Preliminary Report to the Illinois State Board of Health on Water Supplies of Illinois, and the Pollution of its Streams, 1889.

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From Royal Society of Canada. J. G. Bourinot, LL.D., Secretary, Ottawa, Canada:

Proceedings and Transactions of the Royal Society of Canada for the year 1888, Vol, VI.

From William H. Sayward, Boston, Mass.:

Third Annual Convention of the National Association of Builders of the United States of America, held at Philadelphia, Pa., February 12th, 13th and 14th, 1889

From Collingwood Schreiber, Chief Engineer and General Manager Government Railroads, Ottawa, Canada:

Annual Report of the Minister of Railways and Canals for the past fiscal year, from 1st July, 1887, to 30th June, 1888, on the works under his control.

Railway Statistics of Canada and Capital Traffic and Working Expenditure of the Railways of the Dominion for the year 1888.

From the Society of Arts, Manufactures and Commerce. H. Truman Wood, Secretary, London:

Report of Conference on Canals and Inland Navigation, held on Thursday and Friday, May 10th and 11th, 1888.

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From Sociedad de Ingenieros Civiles, Ingeniero Don Manuel B. Bahia, Secretario, Buenos Aires, Argentine Republic, S. A.:

Conferencia Final del curso del Teoria de la Elasticidad dictado en la Facultad de Ciencias Fisico-Matematicas de le Universidad de la Capital por el catedrático Ingeniero. Jorge Duclout, Buenos Aires, 1888.

From Societè des Ingenieurs Civils. M. Henri Vallot, Secretary, Paris, France:

Annuaire de 1889.

From Hamilton Smith, Jr., London:

Report of Hennen Jennings, Esq., Superintendent El Callao Gold Mining Company, Limited, for the year 1888.

From Stevens Institute, Hoboken, N. J.:

The Stevens Indicator:
Vol. VI, No. 2, April, 1889.
Vol. VI, No. 3, July, 1889.

From L. M. E. Stone, Commissioner of Dams and Reservoirs, Providence, R. I.

Annual Report of the Commissioner of Dams and Reservoirs to his Excellency Royal C. Taft, Governor of Rhode Island, January, 1889.

From Charles L. Strobel, Chicago, Ill.:

Pocket Companion, containing useful information and Tables appertaining to the use of Wrought Iron and Steel as Manufactured by Carnegie, Phipps & Co. (Ltd.), Pittsburgh, Pa., 1889.

From A. N. Talbot, Champaign, Ill.:

Report of the Fourth Annual Meeting of the Illinois Society of Engineers and Surveyors, held at Bloomington, Ill., January 23d to 25th, 1889.

From W. M. Thomas, Staff Surveyor, Auburn, Sydney, New South Wales, Australia:

The Journal of the Survey Club, Vol. I, Nos. 1 to 10, 1888–1889.

From L. L. Tribus, New York City:

Catalogue and Circular of the School of Engineering for the year beginning September 28th, 1889, and ending June 13th, 1890. Copies for distribution.

The University of the City of New York. Catalogue and Announcements, 1888–89. Copies for distribution.

From the Trustees of the Newberry Library, Chicago, Ill.:

Proceedings of the Trustees of the Newberry Library for the year ending January 5th, 1889.

From D. Van Nostrand Co., New York City:

Modern Heliographic Processes.

A Manual of Instruction in the Art of Reproducing Drawings, Engravings, Manuscripts, etc., by the Action of Light. Ernst Lutze, New York, 1888.

From United States Commission of Fish and Fisheries, Washington, D. C.:

The Fisheries and Fishery Industries of the United States.

The Fisheries and Fishery Industries of the United States, Section V. History and Methods of the Fisheries, Vol. I, 1887. George Brown Goode, Washington, D. C., 1887.

The Fisheries and Fishery Industries of the United States, Section V. History and Methods of the Fisheries, Vol. II, 1888.

The Fisheries and Fishery Industries of the United States, Section V. George Brown Goode, Washington, 1887. History and Methods. Plates.

From United States Geological Survey, Washington, D. C.:

Seventh Annual Report of the United States Geological Survey, 1885–86. J. W. Powell, Washington, 1888.

Twenty-eight Atlas Sheets.

Bulletin No. 9. On the Relation of the Yard to the Meter.

From Prof. J. A. L. Waddell, Kansas City, Mo.:

Iron Viaducts for Highways.

From J. E. Watkins, Washington, D. C.:

Photograph. First Locomotive to help man, Trevithick, 1804. Run on tramway in Wales.

From Arthur M. Wellington, New York City:

Annual Reports of the Canadian Pacific Railway for the years 1883–85–86–87–88.

From Messrs. Welton & Bennett, Waterbury, Conn.:

Twenty second Report of the Board of Water Commissioners of the City of Waterbury, Connecticut, to the Court of Common Council for the year ending December 31st, 1888.

From Edmund B. Weston, Providence, R. I.:

Appendix to the Annual Report of the City Engineer of the City of Providence, R. I., for the year 1888. Tables showing the cross of head due to the friction of water in new cast-iron pipes.

From S. S. Wheeler, New York City:

Harper's Weekly, July 27, 1889, containing article on Electric Lighting in New York.

From John Wiley & Sons, New York City:

A General Formula for the Uniform Flow of Water in Rivers and Other Channels. E. Ganguillet and W. R. Kutter, New York, 1889.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV.—November-December, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

NOVEMBER 6TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley, in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates declared elected: As Members, Bolton Waller De Courcy, Port Townsend, Wash.; John Quintin Jamieson, Portland, Ore.; William Watkins Kenly, Wilmington, Del.; As Juniors, William Frederick Behrens, Albuquerque, N. M.; Morrison Clark Hamilton, Hartford, Conn.; George Warner Sherwood, Bethlehem, Pa.

A communication from the Institution of Civil Engineers of London, with an illuminated address of welcome to the representatives of the American Societies of Civil, Mining, Mechanical and Electrical Engineers who were received in England in June last, was presented, and President M. J. Becker and Messrs. Charles E. Emery and T. C. Clarke were appointed by the chair a committee to prepare a suitable form of acknowledgment.

A communication from the American Institute of Mining Engineers, with reference to a visit to the United States in the autumn of 1890, of the British Iron and Steel Institution, was presented and was referred to the Board of Direction, with power.

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A progress report of the committee on the revision of the constitution was presented; the report was accepted and the committee continued. The report is as follows:

To the AMERICAN SOCIETY OF CIVIL ENGINEERS:

The undersigned committee, appointed by the Society at its business meeting during the Annual Convention held at Seabright, N. J., on June 24th, 1889, respectfully submits the following report of progress:

First.—The Committee has held two meetings, at the first of which every member was present. At that meeting a sub-committee was appointed to codify the present Constitution and By-Laws and to suggest a form of amended Constitution. A circular was sent out by the Chairman to the various local Engineering Societies, suggesting the appointment by them of Committees authorized to consult with your Committee upon the subject of affiliation.

Second.—So much delay ensued in consequence of the local Societies holding no meetings during the summer months, that their Committees were not appointed until within a month past, and no opportunity has been had for consultation with them upon the subject.

Third.—Your Committee at its first meeting became convinced that the time at its disposal and the magnitude of the various questions involved, would not permit a final report of an amended Constitution to be made in time for submission of it at the Annual Meeting of January, 1890.

In response to the circular sent out by the Chairman to the members of the Society, asking for such suggestions as members desired to make, a large number of communications were received making such suggestions. Some of them very lengthy, many of them very important and requiring much time for their consideration.

Fourth.—Your Committee, at its meeting held October 17th, 1889, at which all but two of the members were present, decided that in order to facilitate the preparation of an amended Constitution, and to the end that the voting thereon could be intelligently done, there should be adopted a codification of the present Constitution and By-Laws, which is submitted herewith for discussion at the Annual Meeting, and for submission to vote of the Society.

Fifth.—This codification contains only verbal amendments to the present Constitution, in which provisions relating to the same subject are scattered miscellaneously, some of them being in the Constitution and some in the By-Laws.

In this codification no change whatever is made in the sense or meaning of the Constitution and By-Laws. The articles are simply grouped together, all of the present articles relating to one subject being codified as one article, the several portions of which are designated as Sections.

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Members will understand that in voting upon this codification, they are not voting upon any amendment of the Constitution and By-Laws excepting only in form, but they are voting for an arrangement of the present Constitution and By-Laws made to enable the work of the Committee to be passed upon intelligently hereafter.

Sixth.—The Committee submits an amendment to the amending clause of the present Constitution, which simply provides that amendments may be considered, discussed and amended at the Business Meeting of the Annual Convention, and voted upon thereafter in the same manner, and in addition to their being considered, discussed and amended at the Annual Meeting and voted upon thereafter as is now provided.

Seventh.—The Committee, in submitting this report of progress, respectfully suggests that it be continued until the Business Meeting of the next Annual Convention, in order that it may have time to fully consider and digest the important suggestions made, and the information obtained bearing upon the subject committed to it.

All of which is respectfully submitted.

WILLIAM P. SHINN,
CHARLES B. BRUSH,
F. COLLINGWOOD,
MENDES COHEN,
O. E. MICHAELIS,
CHARLES L. STROBEL,
S. WHINERY,
Committee.

A codification of the present Constitution and By-Laws, with proposed modification of method of amending the Constitution, was presented, as an amendment to the Constitution, by Messrs. Shinn, Brush, Collingwood, Cohen, Michaelis and Whinery.

The proposed amendment as to method of amending the Constitution is as follows:

SUBSTITUTE THE FOLLOWING FOR ARTICLE IX.

Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Members, and be submitted and acted upon as follows:

1st.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended they shall be voted upon by letter-ballot

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as submitted. The vote to be counted at the first regular meeting in March.

2d.—Amendments presented to the Secretary on or before the first Wednesday in April shall be sent by letter to the several Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and if so amended, shall be voted upon by a letter-ballot in form as amended by said Business Meeting; if not so amended they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in October.

3d.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

Mr. Charles E. Emery, M. Am. Soc. C. E., read a paper descriptive of a recent visit to the Forth Bridge.

NOVEMBER 20TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary.

A paper by Edmund B. Weston, M. Am. Soc. C. E., on The Results of Investigations Relative to Formulas for the Flow of Water in Pipes, was read by the Secretary and discussed by Messrs. Fteley, Brush, Hering, Freeman, Emery and Croes.

MEMOIRS OF DECEASED MEMBERS.

ELLIS SYLVESTER CHESBROUGH, Past President Am. Soc. C. E.

DIED AUGUST 18TH, 1886.

Ellis Sylvester Chesbrough was born in Baltimore County, Md., July 6th, 1813. His mother, Pharina Jones, was a Maryland lady, of German and Welsh ancestry. His father, Isaac M. Chesbrough, was a native of North Adams, Mass. The first ancestor of the Chesbroughs landed at Plymouth, Mass., in 1630.

Owing to unsuccessful business ventures on the part of his father young Chesbrough was obliged to leave school when only nine years of age, and from that time until fifteen years of age attended school for only about one year. When fifteen years old he began life as a chainman with a party engaged on a preliminary survey for the Balti-

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more and Ohio Railroad. Here his natural ability showed itself in so marked a manner that he was rapidly advanced, being occasionally put in charge of a party during his second year of service.

In 1831 he was appointed Assistant Engineer with Col. S. H. Long, United States Topographical Engineer, on the Allegheny Portage Railroad, then being surveyed. In 1831 he was Assistant Engineer, under Capt. William G. MacNeill, on the Paterson and Hudson River Railroad, and afterward held the same position in the location and construction of the Boston and Providence main line, and on the Taunton and New Bedford branch. In 1836 he was Resident Engineer on a proposed railroad from Lowell, Mass., to Concord, N. H.

On December 23d, 1837, Mr. Chesbrough married Miss Elizabeth A. Freyer, of Baltimore, Md. At this time he was a young Assistant Engineer on the Taunton branch of the Boston and Providence Railroad.

For two or three years previous to 1842 Mr. Chesbrough was engaged first under the direction of Major MacNeill and afterwards as acting Chief Engineer, in the surveys and construction of the Louisville, Cincinnati and Charleston Road, during which time the road was built from Charleston to Columbia. Among the engineers of the party of which Mr. Chesbrough had charge in this work were General George S. Greene, afterward President of the American Society of Civil Engineers; the late Alfred W. Craven and J. P. Kirkwood, Members of the Society, and General John C. Fremont.

The financial panic of 1836–37 had made itself felt, as always, very markedly upon the railroad interests of the country, and in the fall of 1842, Mr. Chesbrough found himself, for the first time since a boy of fifteen, thrown out of employment. During the winter he improved his leisure time by entering the workshops of the Stonington Railroad Company, familiarizing himself with the practical use of tools. The following year he bought a farm, adjoining that of his father, in Niagara County, N. Y., but after a brief experience at farming he gladly returned to his profession. From 1844 to 1846 he was engaged in the construction of the Stoughton and the Pawtucket branches of the Boston and Providence Railroad and of the Ashburnham and Brattleboro line.

Up to this time Mr. Chesbrough's work had been entirely in the line of railroad engineering, but in 1846 he was tendered the position of Chief Engineer of the Western Division of the Boston Water Works. Mr. Chesbrough was at this time thirty-three years of age and entirely unacquainted with hydraulic engineering and was extremely loath to undertake the duties of this position, but yielded to the urgency of his friends, the Water Commissioners, and with the assurance that he would have the benefit of the advice of the late Mr. John B. Jervis, M. Am. Soc. C. E., as Consulting Engineer, he accepted the proffered position. The works thus coming under Mr. Chesbrough's supervision were the Cochituate Aqueduct and the Brookline Reservoir. The plans for these

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works had been already matured by Mr. Jervis, and the work was completed in 1849. In 1850 Mr. Chesbrough was made sole commissioner of the works, and in 1851, on the formation of the Cochituate Water Board, was appointed the first City Engineer of Boston, which position he held until 1855, when he resigned to accept the engineership of the Chicago Sewerage Commission.

In December of 1855, Mr. Chesbrough presented a plan for the sewerage of the city, which was finally, after considerable opposition, adopted and carried out, work being begun in 1856. In the latter part of the year Mr. Chesbrough was sent by the Board to examine into the systems of sewerage adopted by the cities of Great Britain and the continent of Europe, which he did with great care and painstaking, the result of his investigations being given in a report published in March, 1858. The importance of this report and the influence it exerted, not only upon Chicago, but on many other cities of the country, can hardly be estimated. At the time the report was written there was not a town or city in the United States that had been sewered in any manner worthy of being called a system. This being, perhaps, the first really exhaustive study which the subject had received on this side of the water, and Chicago being the first city to adopt a systematic sewerage system, the Chicago system soon became famous and Mr. Chesbrough, for twenty-five years, was the recognized head of sanitary engineering in this country.

In 1879 Mr. Chesbrough was appointed Commissioner of Public Works, which position he resigned, together with that of City Engineer, at the beginning of the term of Mayor Carter Harrison.

In 1863, the plan was adopted of a tunnel extending two miles under Lake Michigan to convey pure water to the City of Chicago. This plan had been recommended by Mr. Chesbrough after most careful study. It met with great opposition, and only the characteristic firmness of conviction and modest persistence of Mr. Chesbrough secured its adoption. Its success was immediate, and it has since been supplemented by another similar tunnel. Under his direction were also built two street tunnels under the Chicago River.

In addition to his other labors during his busy life, Mr. Chesbrough was connected as an advisory engineer with very many projects, among them the tunneling of the Detroit River, the planning of the Fullerton Avenue Conduit in Chicago, the Sewerage System of New Haven, Conn., the Water Works of Pittsburgh, the Sewerage of Indianapolis, the Milwaukee Sewerage and Water Works, and the Jacksonville, Fla., and the Akron, O., Water Works. He was also Consulting Engineer on the water works question for the Cities of New York, Boston, Cambridge, Mass., Toronto, Detroit and Memphis; and upon sewerage questions for Boston, Memphis, Peoria, Providence, Des Moines, Dubuque, Burlington, Ia., and Chattanooga, Tenn.

In 1880, when the question of increased water supply for the City of

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New York came up, Mr. Chesbrough was appointed Consulting Engineer for the Department, and, in connection with the then Chief Engineer of the Aqueduct, Mr. Isaac Newton, prepared the plans for the proposed Quaker Bridge Dam and the new Croton Aqueduct, which works have since been carried out mainly in conformity with the plans then agreed upon. In 1882, Mr. Chesbrough was sent by the City of New York to examine some high masonry dams in France and Spain, and it was during this trip that he was overtaken by the illness which finally resulted in his death. He rallied sufficiently from this attack to return to this country and report the result of his examinations to the Department of Public Works in New York, before returning to his home in Chicago; but the Croton Aqueduct work terminated his professional career. From this time until his death in August, 1886, he was a confirmed invalid.

Mr. Chesbrough became a Member of the American Society of Civil Engineers in June, 1868, and was President of the Society from November, 1877, to November, 1878; he had previously been one of the Directors of the Society during the year 1869. A paper entitled "Sketch of the Plans and Progress of the Detroit River Tunnel" was read before the Society by Mr. Chesbrough at the Convention of 1872, and another paper, "The Detroit River Tunnel," was presented by him at the Convention of 1873.

To eminent ability and wide engineering experience, Mr. Chesbrough added that broad common sense essential to the successful engineer.

Slow in forming an opinion and always endeavoring to ascertain all the practical as well as theoretical information which might possibly aid in a correct conclusion, he was, while eminently courteous and mild in manner, practically immovable from an engineering position which he had finally taken. His persistence in this respect led to the adoption and successful execution of some of his most important works, among them, notably, the tunnels under Lake Michigan.

To the quality of far-sightedness, which he possessed in an eminent degree, is due the success of the public works of the City of Chicago, begun under his supervision, even though the evils from which that city now suffers and which were foreseen, and remedies for which were suggested by Mr. Chesbrough, have proved greater than his anticipations. His standard of professional honor was extremely high. It was his fairness and impartiality, together with a cautious and discriminating judgment that rendered his opinion valuable, and caused it to be sought for on so many occasions. His personal character was above aspersion. "The highest Christian ideal, of doing justly, loving mercy and walking humbly, was the rule of his life."

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CHARLES EDWARD FOWLER, M. Am. Soc. C. E.*

DIED JANUARY 28TH, 1883.

Mr. Fowler, for fourteen years City Engineer of New Haven, Conn., was born in Woodbridge, Conn., February 6th, 1841.

His youth was spent in New Haven, Conn., where he received a good high school education and studied surveying under General Palmer.

Early in the war of the rebellion he enlisted in Company G, 20th Conn. Vols., was appointed sergeant, and served in several hard-fought engagements.

His superior abilities as an engineer and draughtsman were recognized by his colonel, and he was detailed for duty at headquarters of the Army of the Cumberland. He was stationed on Lookout Mountain for about a year, engaged in the preparation of plans for hospitals and various engineering work. In 1867 he was engaged as Assistant Engineer on the New Haven and Derby Railroad, then being built. Before the completion of the road he was appointed Chief Engineer, which position he held until his death.

Mr. Fowler was the first City Surveyor of New Haven, being elected in 1869 by the Board of Road Commissioners, without any solicitation on his part.

As the city prospered and grew, the Board of Road Commissioners developed into the Board of Public Works and the City Surveyor into the City Engineer. Mr. Fowler was the unanimous choice of the Board at every election, so admirably did he discharge his official duties.

In addition to his responsible and varied work as City Engineer of New Haven, he prepared plans and estimates for complete systems of sewerage for Northampton, Mass., and Danbury, Conn., and was frequently called in for consultation on important engineering works in other places.

He was an engineer of excellent judgment and very rapid and accurate in his work. As a public officer he was a model of courtesy and tact.

He was always ready to encourage and help his assistants, and was not only respected but loved by them.

Mr. Fowler became a member of the American Society of Civil Engineers, May 3d, 1876.

Mr. Fowler died at his residence in New Haven, of erysipelas, after a short illness, deeply mourned by his widow and two children, a son and a daughter, who survive him.

* Committee to prepare Memoir, Mr. A. B. Hill, M. Am. Soc. C. E.

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FRANCIS ULRIC FARQUHAR, M. Am. Soc. C. E.*

DIED JULY 3D, 1883.

Major Francis U. Farquhar, Corps of Engineers, Brevet Lieutenant Colonel United States Army, died at Detroit, Mich., on July 3d, 1883.

He was born in Pennsylvania, was graduated at the Military Academy at West Point, and promoted to the grade of Brevet Second Lieutenant in the Corps of Engineers, June 24th, 1861.

Ordered immediately into the field, he served as Aid-de-Camp to General Heintzelman in the first battle of Bull Run, and with the Army of the Potomac on the Peninsula. He became Chief Engineer of the Department of North Carolina in January, 1863, and of the Department of Virginia and North Carolina in August, 1863.

From May to August, 1864, he served as Chief Engineer of the Eighteenth Army Corps, particularly in the battle of Cold Harbor and the siege of Petersburg.

After that date he served as Assistant Professor of Engineering at the United States Military Academy, as Assistant Engineer in the defences of Hampton Roads, Va., on the harbor improvements on Lake Erie, and on the Lake Survey. He was assigned to duty as superintending engineer of harbor improvements on the east shore of Lake Michigan in November, 1868, and afterwards served as chief astronomer of the survey of the 49th parallel of latitude, as superintending engineer of river and harbor improvements on the upper Mississippi (including the protection of St. Anthony's Falls), and at the west end of Lake Superior, as Engineer Secretary of the Light House Board, and as Superintending Engineer of the harbors on Lake Huron and of the river improvements from Lake Erie to Lake Superior.

Major Farquhar became a member of the American Society of Civil Engineers July 10th, 1872, and was an active and valued member of the Society. He contributed a paper on "The Preservation of the Falls of St. Anthony," read at the convention at Minneapolis, June, 1883, and published in the Transactions of the Society for October, 1883.

Major Farquhar's health had been gradually failing for about two years previous to his death, although he bore up determinedly, transacting his business until within three hours of his death. He died at Detroit, Mich., July 3d, 1883.

Of great ability and energy, of courteous manners, of unswerving honesty, his loss in the prime of his life will long be deeply felt by those whose privilege it was to know and be associated with him.

His profession has lost one of its most valuable members.

* Committee to prepare Memoir, Gen. Cyrus B. Comstock, M. Am. Soc. C. E.

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ADNA ANDERSON, M. Am. Soc. C. E.*

DIED MAY 15TH, 1889.

General Adna Anderson was born at Ridgway, Orleans Co., N. Y., July 25th, 1827. He began his railway career in 1847, as chainman on the location of the New York and New Haven Railroad. From October, 1847, to November, 1848, he was Assistant Engineer of the Connecticut River Road; from November, 1848, to September, 1849, Assistant Engineer on the Mobile and Ohio Road; from that date to March, 1850, Assistant Engineer on the Ashuelot, N. H., Road. Afterward he was successively Resident Engineer of the Michigan Southern and Northern Indiana Railroad, Locating Engineer of the Mobile and Ohio Road, Chief Engineer of the Tennessee and Alabama Road, Chief Engineer and Superintendent of the Edgefield and Kentucky Road and for a short time Chief Engineer of the Henderson and Nashville Road. When the Edgefield and Kentucky Road failed General Anderson was appointed receiver.

When the war of the rebellion broke out General Anderson offered his services to the Government, and was made Assistant Engineer and Chief of the Construction Corps of the Army of the Potomac in Virginia. In the following year he was made General Superintendent of Government Railroads of the Military Division of the Mississippi. From November, 1864, to July, 1866, he was Chief Superintendent and Engineer of all the military railroads.

From February to May, 1867, he was Chief Engineer of the Illinois and St. Louis Bridge; afterwards General Superintendent of the Kansas Pacific Railroad; then Vice-President and General Manager of the Toledo, Wabash and Western Road. General Anderson was made President of the Lafayette and Bloomington Road in 1873; he was appointed receiver of the Chicago, Danville and Vincennes Road in May, 1875; in February, 1880, he was made Chief Engineer of the Northern Pacific Road.

In the latter part of 1881 General Anderson took a long and fatiguing journey over the proposed line of the Northern Pacific Road, making a personal inspection of the proposed route across the backbone of the continent and through what was then the western wilds.

From the observations made on this long journey from Bismarck to Portland, General Anderson became satisfied that the general route laid

* Committee to prepare memoir: Mr. V. G. Bogue, M. Am. Soc. C. E., Mr. L. L. Buck, M. Am. Soc. C. E., and Mr. W. H. Whiton.

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down by the late W. Milnor Roberts, Past President Am. Soc. C. E., as the line of the Northern Pacific, was in the main correct, at least so far as the line between the Missouri River and Columbia River is concerned, and on this line, substantially, he went on and completed the road, witnessing the driving of the last spike September 8th, 1883.

The main line having been completed from St. Paul to Wallula, where junction was formed with the Oregon Railway and Navigation Company's line, thus making a through line to Portland, the company turned its attention to its Cascade Division, intended to connect its line at some point near the mouth of Snake River, with Tacoma on Puget Sound. Surveys for this division had been in progress much of the time since March, 1880, and much had been done even previous to that date, at intervals, in the way of reconnoissance and preliminary work. The company desired to build on the best attainable line, but to find this line, with conditions then existing, was a work of great difficulty, requiring time, labor and expense. General Anderson took great interest in all this work, but did not express any final judgment until the autumn of 1883, after all the information was available, when he reported that the line ought to be built through Stampede Pass, believing it to be the route that could be operated at least expense and that it would best protect the company from the encroachments of rival enterprises, which judgment has been fully confirmed by the events of the past two years.

In October, 1886, General Anderson was elected 2d Vice-President of the Northern Pacific Road, which position, together with that of Chief Engineer of this road, he held up to January, 1888.

General Anderson married, in 1856, Miss Juliet C. Van Wyck, who with their six children, survives him. The eldest daughter, Miss Sallie, married Lieutenant John C. Fremont, Jr., a son of General John C. Fremont, who is a lieutenant in the United States Navy; the oldest son, Philip Van Wyck Anderson, is a Civil Engineer on the Northern Pacific Railroad, and the younger children, John C., Elizabeth Van Wyck and Mary Van Cortlandt, reside with their mother at their home in Sing Sing.

In May, 1889, General Anderson opened an office in New York, at 155 Broadway, where he was engaged in organizing the Gordon Fire Alarm Company and the Steel Car Company. About a year before his death he contracted what is known as mountain fever while on one of his western trips, from which he never entirely recovered.

General Anderson was a quiet and somewhat taciturn man, of absolute integrity and clear headed, impartial judgment. He was a steadfast, kindly friend through evil or good report. His works were managed with honorable motives and without scandal. He served his country during the long war of the rebellion with honor and fidelity. While he must have had many opportunities to become wealthy in legitimate ways, the

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fact that he died poor shows that no consideration of self interest was allowed to influence him a hair's breadth in his professional duties or in his loyalty to the enterprise he served.

General Anderson deserves to be remembered among men and engineers as one of the noble ones produced by this country.

EDWARD PHELPS ALLIS, F. Am. Soc. C. E.

DIED APRIL 1ST, 1889.

Edward Phelps Allis was born at Cazenovia, N. Y., May 12th, 1824. He graduated from Union College, Schenectady, N. Y., in 1845, his education having been with a view to the practice of law. His tastes, however, favoring an active business life, he went west in 1846, locating in Milwaukee, where in connection with William Allen he opened a leather store under the firm name of Allis & Allen. He remained in this business until 1854, building meanwhile some large tanneries at Two Rivers, Wis., of which he was the active managing director. For a short time Mr. Allis was in the banking and real estate business with Mr. John P. McGregor.

In 1860, he with Mr. C. D. Nash and Mr. McGregor, purchased the Reliance Iron Works, but before a year had elapsed, Mr. Allis secured the interests of the other two gentlemen, and from that time until his death was sole proprietor of what came to be under his management one of the largest, if not the largest manufactories of its kind in the world.

From a moderate beginning Mr. Allis had enlarged and extended these works until the buildings covered three city blocks. Besides these he owned and operated the large Bay State Works in Milwaukee, a foundry on South Bay Street, and rented and operated another foundry in the same city, starting with a business of $32 000 a year, with twenty employés, and a pay-roll of $13 000. This really phenomenal enterprise broadened under Mr. Allis's management into a business of $3 000 000 a year with between twelve hundred and fifteen hundred employés, and a pay roll of over $700 000, whose products are sent to all parts of the world, shipments being made to Japan, Australia, Cuba, South America, the Sandwich Islands, Europe and Mexico.

The Reliance Works were the first in this country to make roller mills for the making of flour by the roller process.

They also stand prominent in the manufacture of steam engines, saw-mill machinery, mining machinery and heavy pumping engines.

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Edward P. Ellis

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Mr. Allis was not an engineer, not an inventor, not a mechanic, but he had in full measure that rare talent for bringing together the work of the engineer, the inventor, the mechanic, that it might come to full fruition, and the world at large be a gainer thereby. From the day he took charge of the small, struggling, bankrupt pioneer shop, until the day of his death, he was the life, the moving spirit of the immense industrial establishment he had created. For nearly thirty years he gave to the great work of his life all that could be given of tireless industry, unflagging energy, and persevering determination.

Mr. Allis was prominently interested in the association for advancement of Milwaukee, which took so active a part in the arrangements for the entertainment of the Society of Engineers at the Convention of 1888 in Milwaukee.

He became a Fellow of the American Society of Civil Engineers in July, 1883, and always manifested an active interest in its affairs.

Though not a politician, Mr. Allis was an interested member of the Republican party until 1877, when he became an advocate of the Greenback party, and accepted its nomination for Governor of Wisconsin. He made a personal canvass of the State, and by means of his great earnestness, administrative ability and personal magnetism, won for the party a power in State politics, receiving over twenty-six thousand votes, where before the party had polled only a few hundred.

Mr. Allis was a man of much culture, and possessed an appreciation and love for the finer things of life in a prominent degree. A friend who had known him long and well says: "The panegyrist of Edward P. Allis, no matter how eloquently he speaks, can never express the deeper feeling of silent and true appreciation of those with whom he was intimately acquainted. His success in business would have marked him a prominent man in any community. His retiring modesty, his fine culture and broad learning, would have given him high social standing anywhere, but when to these qualities, great in themselves in him, were added the higher principles of benevolence, fraternity and human feeling, which prompted him to conceive and carry out his plans for the benefit of his working men, we see in every phase of his being the true man. His name will live in the future a powerful example for employers to follow, and will do more to harmonize capital and labor in our city than statutes or boards of arbitration."

To which another adds: "Modest yet bold, tender yet strong, mild yet firm, unusually successful, in still greater measure useful, he was above all men I know beloved by the people. The world is better for his having lived."

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MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

DECEMBER 4TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Edward Manning Bigelow, Pittsburgh, Pa.; Edward Everett Buchanan, Athens, Pa.; Emerson Warren Grant, Granbury, Texas; Frederick Thomas Hatch, Indianoplis, Ind.; Herbert Cary Keith, Braintree, Mass.; John Anderson Baush Tompkins, Milwaukee, Wis.; William Glyde Wilkins, Pittsburgh, Pa. As Juniors: George Henry Blakeley, Paterson, N. J.; John Blodgett, Albuquerque, N. M.; George Washington Cole, Wagoner, Ind. Ter.; Solomon Jacob Harwi, Mauch Chunk, Pa.; Francis Charles Trowbridge, Hamilton, O.; Henry Vier, New York City.

A communication from Mr. James Forrest, Secretary of the Institution of Civil Engineers of London, in reference to the acceptance of the address from the American Engineers by Her Majesty Queen Victoria, was read.

The appointment of Messrs. R. Hering, C. F. Loweth and F. W. D. Holbrook as the Board of Censors to award the Norman Medal, was announced.

The appointment of Messrs. George Y. Wisner and Alfred Noble, together with the Secretary of the Society as the Committee to award the Rowland Prize, was announced.

DECEMBER 18TH, 1889.—The Society met at 20 o'clock, Charles B. Brush, Director Am. Soc. C. E., in the chair; John Bogart, Secretary.

The Secretary announced the death, on December 7th, 1889, of Civil Engineer Henry S. Craven, U. S. N.

Announcements were made as to the approaching Annual Meeting.

A paper by Franz A. Velschow, C. E., on the "Causes of Trade Winds," was read and discussed by Messrs. Brush, Crowell, Croes and Velschow.

OF THE BOARD OF DIRECTION.

OCTOBER 3D, 1889.—Applications were considered. The report of the Nominating Committee was presented and, on motion, was ordered printed and issued to all members of the Society. The appointment of

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the Board of Censors to award the Normal Medal and of the Committee to award the Rowland Prize was considered.

NOVEMBER 7TH, 1889.—Applications were considered. A communication from the American Institute of Mining Engineers with reference to a proposed visit of the British Iron and Steel Institution, referred to the Board of Direction with power, was considered and a committee of inquiry was appointed. A circular letter from the Committee on Finance of the International Exhibition of 1892 was considered. Appropriations made.

DECEMBER 5TH, 1889.—Applications were considered. Arrangements for the Annual Meeting were made.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BUCHANAN, EDWARD EVERETT	Elmira Bridge Co., Elmira, N. Y.	Dec. 4, 1889
DE COURCY, BOLTON WALLER	Chief Engineer, Port Discovery, Quillayonte and Olympic R. R., Port Townsend, Wash.	Nov. 6, 1889
GERMANN, FRANZ	38 Ahumada, Santiago, Chili	April 3, 1889
GIAVER, JOACHIM GODTSKE	Shiffler Bridge Works, Pittsburgh, Pa	July 3, 1889
JAMIESON, JOHN QUINTIN	Division Engineer, Oregon Railway and Navigation Co., Portland, Oregon	Nov. 6, 1889
PATTERSON, JOHN CURTIS	Assistant Chief Engineer, Central New England and Western R. R., Poughkeepsie, N. Y.	Oct. 2, 1889
WILLARD, JAMES EAGER	733 Fulton st., Louisville, Ky.	May 1, 1889

ASSOCIATE.

LEWIS, FRANK CLIFFORD	122 Euclid ave., Cleveland, Ohio	June 5, 1889

JUNIORS.

HAMILTON, MORRISON CLARK	Assistant Engineer, New York, New Haven and Hartford R. R., New Haven, Conn.	Nov. 6, 1889

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HARWI, SOLOMON JACOB.....Chief Engineer's office, Lehigh Valley R. R., Mauch Chunk, Pa ..... Dec. 4, 1889

ROSENBERG, FRIEDRICH.....Supervisor Division A, New York Division Pennsylvania R. R., Jersey City, N. J..... Oct. 2, 1889

SHERWOOD, GEORGE WARNER....Instructor Civil Engineering, Lehigh University, Bethlehem, Pa..... Nov. 6, 1889

CHANGES AND CORRECTIONS.

MEMBERS.

ALLEN, KENNETH.....Superintendent Construction, Board of Public Works, Kansas City, Mo.

BOOTH, WILLIAM H.....28 St. Mary's Road, Willesden Junction, London, N. W., England.

CAIN, WILLIAM.....University of North Carolina, Chapel Hill, N. C.

COFFIN, WILLIAM B.....708 College ave., Elmira, N. Y.

CRAVEN, ALFRED.....Division Engineer, New Croton Aqueduct, P. O. Box 790, Yonkers, N. Y.

ERNST, OSWALD H.....Col. Corps of Engineers U. S. A., War Department, Washington, D. C.

FANNING, JOHN T.....Consulting Engineer, St. Paul, Minneapolis and Manitoba Ry., Manitoba Ry. Bldg., St. Paul, Minn.

FOOTE, ARTHUR D.....Engineer of Irrigation, Snake River Division, U. S. Geological Survey, Boise City, Idaho.

HOUSE, BRUCE F.....Assistant Engineer, San Antonio and Aransas Pass. Ry., Houston, Texas.

LANDRETH, WILLIAM B.....White Plains, N. Y.

MCDONALD, HUNTER.....Superintendent H. F. & C. Div. Nashville, Chattanooga and St. Louis Ry., Fayetteville, Tenn.

MCGRATH, WALLACE.....National Military Home, Leavenworth, Kans.

MILLER, J. IMBRIE.....Bryn Mawr, Pa.

MINTURN, ROWLAND R.....Acting Superintendent, Chicago, Milwaukee and St. Paul Ry., Milwaukee, Wis.

MORRIS, GOUVERNEUR.....467 West 23d st., New York City.

OCKERSON, JOHN A.....U. S. Assistant Engineer Mississippi River Commission, 2732 Pine st., St. Louis, Mo.

OPDYKE, STACY B., JR.....General Superintendent Central New England and Western R. R., Hartford, Conn.

PAINE, ARTHUR B.....Consulting Engineer, P. P. & B. R. R., Goshen, N. Y.

PARET, MILNOR P.....U. S. Engineer's office, Savannah, Ga.

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PIHL, OLAF R.....(Care Hoffman and Bates), First National Bank Bldg., Portland, Ore.
PRATT, MASON D.....Assistant Chief Engineer Johnson Co., Johnstown, Pa.
PRENDERGAST, F. E.....National City, Cal.
SAVAGE, ALBERT C.....342 Seventh ave., Brooklyn, N. Y.
SCHMIDT, MAX O. E.....Civil Engineer and Contractor, 1138 The Rookery, Chicago, Ill.
SMITH, MILLER A.....Assistant Engineer Department of City Works, Brooklyn, N. Y.
STEPHENS, CLINTON F.....1502 Washington ave., St. Louis, Mo.
STEWART, JOHN M.....Assistant Engineer, New Croton Aqueduct, The Dunnellyn, Yonkers, N. Y.
TEMPLE, ROBERT H.....Chief Engineer Georgia, Carolina and Northern Ry., Greenwood, S. C.
TOMLINSON, ALFRED T.....The Rosenfeld Construction Co., Opera House Block, Denver, Colo.
WAITE, CHRISTOPHER C.....President Columbus, Hocking Valley and Toledo Ry., Columbus, Ohio.

JUNIORS.

CARLL, DAVID S.....17 Security Bldg., Kansas City, Mo.
CLARKE, ST. JOHN.....Care Bridge Dept., Baltimore and Ohio R. R., Baltimore, Md.
CONNETT, ALBERT N.....Care Washington and Georgetown Ry., Georgetown, D. C.
TAPPAN, ROGER.....Russell Cottage, Kearsarge, N. H.
VILLALON, JOSÉ R.....32 Nassau st., Room 723, New York City.

RESIGNATIONS.

MEMBER.

	Date of Resignation.
WEEKS, HARVEY R.	Dec. 20, 1889

ASSOCIATES.

ANDREWS, EDWARD R.	Dec. 12, 1889
MORDECAI, GRATZ	Dec. 14, 1889

DEATH.

CRAVEN, HENRY S.....Elected Member December 3, 1884; died December 7, 1889.

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THE NORMAN MEDAL.

CODE OF RULES FOR ITS AWARD.

I.—Competition for the Norman Medal of the American Society of Civil Engineers shall be restricted to Members of the Society.

II.—There shall be one gold medal, and only one, struck for each and every fiscal year of the Society, and awarded as hereinafter provided. The dies therefor shall be with the Superintendent of the United States Mint at Philadelphia, in trust exclusively for the above purpose. Such medal shall be of a cost equal to the annual interest received upon $1 000 of the Consolidated Stock of the City of New York, Certificate No. 179, of the additional new Croton Aqueduct Stock of the City of New York, authorized by an Act of the Legislature of the State of New York, Chap. 230, passed April 15th, 1870, dated November 17th, 1873, now held in trust by the Treasurer of this Society, and so held solely for this purpose, and shall be executed upon his order.

III.—All original papers presented to the Society by Members of any class, during the year for which the medal is awarded, shall be open to the award, provided that such papers shall not have been previously contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Society, nor have been presented to the Society in any previous year.

IV.—The Board of Censors to award the medal shall consist of three Members of the Society, to be designated by the Board of Direction. The Secretary of the Society shall act as Secretary to the Board of Censors.

V.—The medal shall be awarded to such paper as the said Board shall judge to be worthy of special commendation for its merits as a contribution to engineering science, not merely relatively as compared with others presented during the same year, but as exhibiting the science, talent or industry displayed in the consideration of the subject treated of, and for the good which may be expected to result from the discussion and the inquiry.

VI.—In case no paper presented during the year shall be deemed of sufficient value to receive an award, the amount of the interest of the fund for that year shall be expended by the Board of Direction in the purchase of books, to be offered as a premium for the second best paper in the next year in which more than one paper of sufficient value may be presented.

VII.—The medal year shall terminate on the first day of August, and the award shall be announced at the annual meeting.

VIII.—The Treasurer of this Society shall cause the medal to be prepared and delivered to, or deposited to the order of, the successful competitor, within two months after the annual meeting at which the same shall have been awarded.

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THE ROWLAND PRIZE.

CODE OF RULES FOR ITS AWARD.

Not more than one prize shall be awarded each year for papers presented during the year. The year shall terminate on the first day of August, and the award shall be announced at the annual meeting in January.

The prize shall consist of fifty dollars in cash.

The award shall be made by a committee consisting of the Secretary and two Members of the Society, to be appointed by the Board of Direction.

The prize shall be awarded to such paper as the committee deem most worthy of such recognition, the preference being given to papers describing in detail accomplished works of construction, their cost and manner of execution, and the errors in design and execution.

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, NEW YORK, JANUARY 15TH, 1890.

The Special Committee on Uniform Standard Time beg leave to report:

At the last Annual Meeting the Society passed two resolutions. One directing that further efforts be made to effect the general adoption of the 24-hour notation by the railways of the country. Another requesting the Committee to take such steps as may be approved by the Board of Direction of the Society to bring the subject of time reform to the attention of the public schools.

The Committee has endeavored to carry out both resolutions; the members have not, however, succeeded in meeting the views of the Society with regard to the second resolution. They have had a good deal of correspondence on the subject, but so far have been unable to satisfy themselves as to the best form and manner of carrying out the resolution.

With respect to the first resolution, the Committee is enabled to report absolute and substantial progress, the last annual report of the Committee, together with other documents bearing on the question having been published in pamphlet form, and widely circulated. Railway managers and others were asked to state their views as to the adoption of the new notation by the railways of the country.

The Committee have to announce the receipt of 237 replies to the circular issued; of these 17 are unfavorable and 220 favorable to the adoption of the proposed change.

Persons answering the circular were requested to indicate the year when, in their opinion, the change might be effected, allowing sufficient time for such preparation as might be deemed necessary.

In the 220 favorable replies received:

27	named the year	1892
68	" "	1891
95	" "	1890
30	gave no date.	

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Thus it appears that none of these replies give a later date than 1892, nearly half the whole number named the present year, and, if we assume, what is highly probable, that the 30 persons who mention no date would concur in the views of the majority, no less than 84 per cent. of the whole number think the change might be effected not later than the year 1891, should a general assent be first expressed.

The last annual report was copied in the following technical journals with favorable endorsements, and probably into other publications which the members of the Committee did not see:

The Travelers' Official Guide.
The Railway Conductors' Monthly.
The Railroad Gazeteer, of San Francisco.
Journal of the Brotherhood of Locomotive Engineers.
The Railroad Gazette, of New York City.
The Railway Age, of Chicago.
Engineering News, of New York City.
The Railroad Record, of Philadelphia.

It has not come to the knowledge of the Committee that any journal has at any time expressed any opposition to the new notation.

The Committee has considered it advisable to tabulate the replies recently obtained with those received in previous years. It thus appears that between five and six hundred prominent men in every section of the country have responded to the Society's interrogations, and of these an exceedingly small percentage have given expression to an opinion adverse to the early adoption of the new notation.

As it is especially important to ascertain the opinions of leading railway men on this question, the Committee has caused a classification to be made of the Presidents, Managers, Superintendents and others, who have favorably responded to the Society's communications.

The list so prepared accompanies this report. It embraces the following railway authorities who are in favor of the simultaneous adoption of the 24-hour notation on the railways in the country so soon as it is ascertained that a considerable majority will give their assent.

Presidents and Vice-Presidents	30
Vice-Presidents and Managers	13
General Managers and Assistant General Managers	80
General Superintendents	73
Superintendents	110
Chief Engineers and Assistants	63
Managers of Transportation and General Traffic	10
Receivers	5
Total	384

The aggregate length of railways with which these officers are connected amounts to fully 135 000 miles, and although all of the officers on each line have not yet expressed an opinion, the Committee are inclined

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to believe that when heard from the greater number of them will express the same views on this question.

While the Committee ventures to congratulate the Society on the highly satisfactory results of the inquiries so far made, they are of opinion that as the matter concerns so many people it will be best to proceed with wise deliberations; they, therefore, beg leave to suggest that the ascertained facts be communicated to the journals above mentioned, and that further efforts be made to secure an expression of the greatest possible unanimity, especially among railway men.

General unanimity satisfactorily established among those who control the railways of the country, it will then be fit and proper for them to take decisive action. It is obvious that the change should be effected simultaneously six or twelve months after an agreed date, and the proper authority to determine the date is the General Time Convention.

The Committee cannot doubt that when the change to the new notation comes to be satisfactorily established the entire railway system and the community generally will recognize that a public boon has been conferred not less valuable than that already conferred by the adoption of standard time.

The Committee has the satisfaction to report that the hour zone system is now approved by the railway administration in Austro-Hungary, soon to be followed, it is believed, in Germany, Italy and Switzerland. The reckoning of time in Great Britain and Sweden is already in harmony with the hour zone system. The 24-hour notation has been adopted for railway service in China.

The Committee deem it proper to bring to the notice of the Society that the Government of the United States has so far taken no action on the resolutions and recommendations of the Washington International Conference of 1884. As the reforms in time-reckoning so largely adopted and proposed to be adopted in this country are in harmony with the resolutions of the conference, and as questions are constantly arising as to the legal aspect of standard time, it would be in the public interest to have the recommendations of the conference authoritatively recognized, and also perhaps some satisfactory statutory enactment legalizing the changes made and contemplated in respect to the reckoning of time.

The Committee respectfully suggest that the Society should memorialize the United States Government on this subject.

SANDFORD FLEMING,
CHARLES PAINE,
THEODORE N. ELY,
J. M. TOUCEY,
T. EGLESTON,
FRED. BROOKS,
Committee.

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FORM OF MEMORIAL PROPOSED BY THE COMMITTEE ON UNIFORM STANDARD TIME.

ORDERED AT ANNUAL MEETING, JANUARY 15TH, 1890, TO BE SUBMITTED TO LETTER BALLOT.

The Memorial of the AMERICAN SOCIETY OF CIVIL ENGINEERS in Annual Meeting assembled,

Respectfully showeth:

1. That the application of science in facilitating intercourse between places separated by great distances has developed imperfections of time-reckoning not previously experienced; moreover, it has been found that the difficulties increase with the increase of population and the multiplication of lines of rapid communication.

2. That efforts have been made during the past ten years to obviate the difficulties which have sprung up by establishing a modified system of time-reckoning based on principles generally acceptable.

3. That the President of the United States, on the authority of Congress, invited the governments of all civilized nations to take part in the solution of the problem, by appointing delegates to meet in general Conference to consider the matter.

4. That delegates representing twenty-five nations met in Conference at Washington in 1884, and that after patient deliberation and prolonged discussion, they with substantial unanimity passed a series of resolutions recommending the leading principles by which the desired objects could be best attained.

5. That the International Conference recommended a common zero and a common unit measure of time, the universal day, which any community may spontaneously adopt as the standard for daily reckoning. That the Conference recommended the division of the universal day into twenty-four hours, to be reckoned in a single series of numbers from 0 to 24 in consecutive order.

6. That by the system now in general use throughout the United States and Canada the hours, though differently numbered, are simultaneous with the hours of the universal day, and that it is now in contemplation in many quarters to adopt the 24-hour notation for railway reckoning as recommended by the Conference for the universal day.

7. That so far the Government of the United States has taken no action on the recommendations and resolutions of the International Conference, and legal authority has not been extended to the reform in time-reckoning, to a large extent adopted throughout North America.

Wherefore, the American Society of Civil Engineers, in Annual Meeting assembled, respectfully represents to the Government of the United States, as follows, viz.:

First.—That, in the opinion of this Society, it would be in the general interests of the United States to formally accept the resolutions of the International Conference held at Washington in 1884.

Second.—That, in the opinion of this Society, it would be in the general interests to legalize by Act of Congress the now common system of regulating time by hour meridians.

Third.—That, in the opinion of this Society, it would be in the general interests to embrace in an Act of Congress a permissive clause authorizing and legalizing the use of the 24-hour notation.

On behalf of the Society.

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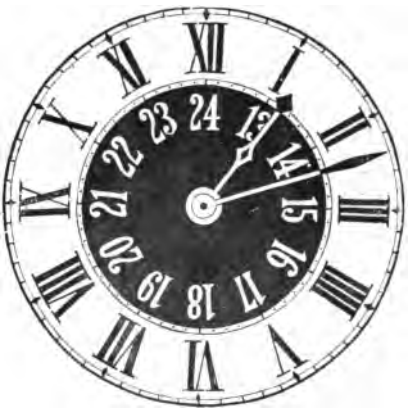
RAILWAY MANAGERS IN FAVOR

—OF THE—

NEW NOTATION OF TIME.



The following is a list of railway men who have sent replies favoring the adoption of the 24-hour notation as soon as a considerable majority of railway authorities assent:

THE LIST COMPRISES:

Presidents and Vice-Presidents	30
Vice-Presidents and Managers	13
General Managers and Assistant General Managers	80
General Superintendents	73
Superintendents	110
Chief Engineers and Assistants	63
Managers of Transportation and General Traffic	10
Receivers	5
Total	384

A large number of prominent persons not connected with railways have also sent replies in favor of the new time notation. Only an exceedingly small percentage of all heard from in every quarter have expressed an opinion unfavorable to the change.

It has been suggested that the change should be effected simultaneously on all railways twelve months after an agreed date, which date may be chosen by the General Time Convention.

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NOTE.—The years given in the last column indicate the time suggested for effecting the change, in some of the replies received in 1889. The letter A in last column refers to list published in August, 1889; the letter B to list published in January, 1887; the letter C to list published in 1884.

Adirondack	C. E. Durkee	Supt	B
Alabama Midland	C. M. Craig	Asst. Engr	1891
Alleghany Valley	David McCargo	Gen. Supt	B
Arkansas Valley	H. Wood	Gen. Supt	A
Atchison, Topeka & Santa Fé	A. A. Robinson	Gen. Man	B
Atchison, Topeka & Santa Fé	D. I. Chase	Gen. Man	A
Atchison, Topeka & Santa Fé	Avery Turner	Supt	1891
Atchison, Topeka & Santa Fé	H. V. Hinckley	Off. Engr	1890
Atlantic Coast Line, Rich. Div.	H. Walters	Gen. Supt	A
Atlantic Coast Line, Char. Div.	John F. Divine	Gen. Supt	A
Atlantic & N. Carolina	W. Dunn	Supt	B
Atlantic & Pacific	S. W. Robinson	Eng. Bri	—
Baltimore & Ohio	S. Spencer	V. Pres	C
Baltimore & Ohio	G. B. Hazlehurst	Eng. Brdgs	1891
Baltimore & Ohio	James G. Dagron	Supt. Brdgs	1892
Beech Creek	A. G. Palmer	Supt	1891
Belaire, Zanesville & Cincinnati	W. R. Compton	Gen. Man	B
Bennington & Rutland	F. C. White	Gen. Supt	B
Boston, Hoosac Tunnel & West	C. A. Coombs	Gen Man	A
Boston, Hoosac Tunnel & West	Chas. H. Covy	Supt	B
Boston, Barre & Gardner	H. H. Marshall	Supt. & Tr. Man	B
Boston & Lowell	C. S. Metten	Gen. Supt	B
Boston & Providence	Albert A. Folsom	Supt	B
Boston, R. Beach & Lynn	C. A. Hammond	Supt	B
Brazos & Northern	G. Y. Wisner	2nd V. Pres	1890
Brooklyn, Bath & C. I	Geo. A. Gunther	Gen. Man	B
Brooklyn, Bath & West End	John P. Heindell	Gen. Supt	1892
Brunswick & Western	H. S. Morse	Gen. Man	B
Buffalo & Geneva	Paul S. King	Ch. Eng	1892
Buffalo, N. Y. & Phil	Geo. S. Gatchell	Gen. Supt	B
Buffalo, N. Y. & Phil	J. W. Watson	Supt	B
Buffalo, Rochester & Pittsburgh	G. W. Bartlett	Gen. Supt	1890
Burlington, Cedar Rapids & N.	Robert Williams	V. P. & Supt	A
Burlington, Cedar Rapids & W.	C. J. Ives	Gen. Supt	A
California Southern Ry	J. N. Victor	Supt	B
Canadian Government	C. Schreiber	Gen. Man	1890
Canadian Government	D. Pottinger	Chief Supt	1890
Canadian Government	P. S. Archibald	Chief Eng	1890
Canadian Government	J. E. Price	Supt	1890
Canadian Government	J. J. Wallace	Supt	1890
Canadian Government	A. R. Macdonald	Supt	1890
Canadian Pacific	W. C. Van Horne	President	1890
Canadian Pacific	T. G. Shaughnessy	Asst. Pres	1890
Canadian Pacific	George Olds	Gen. Tr. Man	1890
Canadian Pacific	Henry Beaty	Man. S. L	1890
Canadian Pacific	T. A. Mackinnon	G. Sup. O & A. Div.	1890
Canadian Pacific	C. W. Spencer	Gen. Sup. E. Div.	1890
Canadian Pacific	Wm. Whyte	Gen. Sup. W. Div.	1890
Canadian Pacific	Harry Abbott	Gen. Sup. P. Div.	1890
Canadian Pacific	W. T. Jennings	Eng. & Man. Cons.	1890
Cape Fear & Yadkin Valley	J. S. Morrison	Gen. Supt	B
Cape Fear & Yadkin Valley	J. W. Fry	Gen. Supt	A
Catasauqua & Fogelsville	C. W. Chapman	Supt. & Eng	1891
Central of Georgia	M. S. Belknap	Gen. Man	A

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Central of Georgia	Wm. Rogers	Gen. Supt	B
Central of Georgia	C. E. Marrin	R. Master	1892
Central Iowa Ry	D. P. Phelps	Asst. Supt	B
Central N. England & Western	S. B. Opdyke, Jr.	Gen. Supt	1890
Central N. England & Western	Geo. N. Merrill	Res. Eng	1890
Central Pacific	J. H. White	Supt	B
Central Vermont	J. W. Hobart	Gen. Man	B
Central Vermont	C. A. Converse	Asst. Supt	B
Central of New Jersey	J. H. Olhauson	Gen. Supt	—
Charleston, Cin. & Chicago	John F. Jones	Supt. & Tr. Man	—
Charleston & Savannah	C. S. Gadsden	Gen. Supt	1891
Chattoroi Ry	F. H. Oliphant	Gen Man	B
Chesapeake & Ohio	J. T. Harahan	Gen. Man	1891
Chesapeake & Ohio	H. D. Whitcomb	Con. Eng	1890
Chesapeake & Ohio	T. C. Eggleston	Eng. M. W	1891
Chesapeake, Ohio & S. W	J. L. Frazier	Supt	B
Chicago, Burlington & Northern	Geo. B. Harris	Gen. Man	A
Chicago, Burlington & Quincy	J. Potter	V. Pres	C
Chicago, Burlington & Quincy	F. Lawler	Div. Eng	1891
Chicago, Fair. & Eau Claire	G. A. Foster	Asst. Gen. Man	B
Chicago & East Illinois	O. S. Lyford	V. P. & Gen. Man	1892
Chicago & N. Michigan	J. H. V. Agnew	Gen. Supt	1892
Chicago & N. Western	C. Palmer	Supt. Bridges	1891
Chicago, Santa Fé & Cal	E. G. Nourse	Asst. Eng	1892
Chicago, M. & St. Paul	L. B. Rock	Supt	B
Chicago, M. & St. Paul	Onward Bates	Supt. Bridges	1891
Chicago, M. & St. Paul, W. Div.	J. H. Lakey	Supt	B
Chicago & Atlantic	J. H. Parsons	Supt	A
Chicago & Atlantic	Fred. Broughton	Gen. Man	A
Chicago & Grand Trunk	A. B. Atwater	Supt	1891
Chicago & Grand Trunk	W. H. Pettibone	Supt	B
Chicago & N. Western	J. Whitman	Gen. Man	—
Chicago, Rock Island & Pacific	W. I. Allen	Gen. Supt	1892
Chicago, Rock Island & Pacific	H. F. Royce	Gen. Supt	A
Chicago, Rock Island & Pacific	A. Kimball	V. Pres	B
Chicago, Rock Island & Pacific	R. H. Chamberlin	Supt	B
Chicago, St. Paul & Kansas	John M. Eagan	Gen. Man	1891
Chicago & West Indiana	B. Thomas	V. P. & Gen. Man	1890
Chippewa Val. Ch. & W. Mich.	A. M. Nichols	Gen. Supt	B
Cincinnati, Ham. & Dayton	C. C. Waite	V. Pres	B
Cincinnati, Jackson & Wash	R. W. Buckmaster	Sup. Trans	A
Cincinnati & Musk. Valley	F. G. Darlington	Supt	1890
Cincinnati & Musk. Valley	W. C. Cushing	Eng. M. W	1890
Cincinnati, N. O. & Texas	W. C. Jewett	Res. Eng	1892
Cincinnati, N. O. & Texas	R. Carroll	Gen. Supt	B
Cincinnati, N. O. & Texas	G. B. Nicholson	Ch. Eng	1891
Cincinnati, N. O. & Texas	Ward Baldwin	Asst. Eng	1891
Cincinnati Union Depot	R. L. Read	Eng	—
Cincinnati, Van W. & Mich	E. Garrison	Gen. Man	B
Cincinnati, Washington & Balt.	J. H. Stewart	Gen. Man	A
Cleveland, Ak. & Columbus	N. Monsarratt	Pres. & Gen. Man	A
Cleveland, Cin. Ch. & St. L.	E. A. Hermann	Asst. Eng	—
Cleveland & Canton	J. W. Wardwell	Supt	1891
Cleveland & Canton	H. A. Kennedy	Asst. Supt	1890
Cleveland, Col. Cin. & Ind.	J. D. Layng	Pres	A
Cleveland, Col. Cin. & Ind.	G. M. Mead	Gen. Man	A
Colorado Midland	H. Collbran	Asst. Gen. Man	1891
Columbus, Hocking Val. & T.	G. R. Carr	Gen. Supt	B
Columbus & Western	E. A. Flewellan	Gen. Man	B
Conotton Valley	Samuel Briggs	Gen. Man	B
Coudersport & Port Allegh	B. A. McClure	Gen. Supt	B

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Delaware & Hudson	H. G. Young	Gen. Man	A
Delaware & Hudson	C. D. Hammond	Supt	1891
Delaware & Hudson	J. W. Burdick	Gen. Pas. Agt.	A
Delaware & Hudson	A. J. Swift	Chief Eng	1890
Delaware, Lack. & Western	Chas. C. Rose	Div. Eng	1890
Delaware, Lack. & Western	W. B. Phelps	Supt	B
Denver & Rio Grande	S. T. Smith	Gen. Man	1890
Denver & Rio Grande	C. Lydon	Supt	B
Denver & Rio Grande	R. E. Briggs	Ch. Eng	1890
Denver, Utah & Pacific	L. M. Fouts	Supt	A
Denver, Texas & Fort Worth	F. E. Bissell	Supt. & C. E	1890
Detroit, Mack. & Marquette	D. McCool	Gen Supt	B
Detroit, Lansing & Northern	F. M. Drake	Asst. Supt	1892
Detroit, Lansing & Northern	Job Tuthill	Ch. Ass. Eng	1892
Detroit, Lansing & Northern	J. J. McLean	Chief Eng	1892
Dunkirk, All. Val. & Pittsburgh	Chas. A. Chute	Asst. Supt	1891
Dunkirk, All. Val. & Pittsburgh	D. Thayer	Gen. Supt	A
East Tenn., Virginia & Georgia	C. H. Hudson	Gen. Man	A
East Tenn., Virginia & Georgia	J. W. Fry	Supt	B
East Tenn., Virginia & Georgia	H. Fink	V. Pres. & G. Man.	B
East & West of Alabama	John Postell	Gen. Man	B
Eureka & Palisade	B. Gilman	Gen. Supt	B
Eureka Springs	Powell Clayton	V. Pres. & G. Man.	B
Evansville & Terre Haute	T. A. Allen	Ch. Eng	1891
Fairhaven Southern	J. J. Donovan	Ch. Eng	1891
Fall Brook Coal Co	G. R. Brown	Gen. Supt	1892
Fall Brook Coal Co	W. A. Foster	Supt	1890
Fitchburg	H. A. Phillips	Supt	1890
Flint & Pere Marquette	Sanford Keeler	Supt	1891
Flint & Pere Marquette	D. Edwards	Asst. Gen. Man	B
Flint & Pere Marquette	W. F. Potter	Supt	B
Flint & Pere Marquette	Geo. M. Brown	R. Master	B
Florida Ry. & N. Co	J. J. Phillips	Asst. Gen. Man	A
Fort Wayne, Cincin. & L	H. W. Worthington	Gen. Supt	A
Fort Worth & Denver City	C. L. Frost	Supt	B
Fort Madison & N. Western	Chas. A. Gilchrist	Rec. & Supt	1891
Georgia	J. W. Green	Gen. Man	1891
Georgia	S. A. Hamphill	Supt	A
Georgia Pacific	T. G. Sage	Gen. Man	A
Georgia Pacific	J. W. Sage	Gen. Supt	B
Georgia Southern & Florida	J. Lane	Gen. Man	1891
Grand Trunk of Canada	Joseph Hickson	Gen. Man	—
Grand Trunk of Canada	Wm. Wainwright	Asst. Man	B
Grand Trunk of Canada	J. Stephenson	Supt	B
Grand Trunk of Canada	Samuel Barker	Man. N. Div	B
Grand Trunk of Canada	Charles Stiff	Supt	A
Galveston, Sabine & St. L	B. Barnes	V. Pres. & G. Man	B
Galveston, Harr. & San Antonio	W. G. Van Vleck	Supt	B
Grand Southern	F. W. Holt	Supt. & Eng	B
Green Bay, Winona & St. Paul	Timothy Case	Gen Supt	B
Gulf, W. Texas & Pacific	M. D. Monserate	Pres	B
Gulf, Colorado & Santa Fé	J. H. Scott	Gen. Supt	1890
Hartford & Connecticut Western	R. P. Martin	Supt	1890
Hartford & Connecticut Western	John F. Jones	Gen. Supt	B
Houston & Texas Central	G. A. Quinlan	Gen. Supt	1890
Houston & Texas Central	J. Waldo	V. Pres	B
Houston & Texas Central	Donald Allen	Eng. & Supt	B
Houston, E. & W. Texas	W. H. Wentworth	Asst. Gen. Man	B
Houston, E. & W. Texas	M. G. Howe	Receiver	1890
Illinois Central	E. T. Jeffrey	Gen. Supt	B
Illinois Central	C. M. Shaeffer	Supt	B

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Indiana, Ill. & Iowa	T. P. Shouts	Gen. Supt	B
Indianapolis, Decatur & Western	L. A. Boyd	Supt	1890
Indianapolis, Decatur & Sp'gfield	G. W. Bender	Supt	A
Indianapolis & St. Louis	T. W. Burrows	Supt	A
International	D. E. McFee	Supt	B
Jacksonville, Tampa & K. W	C. O. Parker	Asst. Gen. Man	1890
Jacksonville S. Eastern	E. S. Greenleaf	Supt	B
Jeffersonville, M. & Indianapolis	E. W. McKenna	Supt	B
Kanawha & Ohio	L. D. Button	Supt	1892
Kanawha & Ohio	Thos. R. Sharp	Gen. Man	A
Kansas City B. M.	W. B. Knight	Ch. Eng	—
Kansas City, F. Scott & Memphis	Geo. H. Nettleton	Pres & Gen. Man	A
Kansas City, F. Scott & Memphis	W. W. Fagan	Gen. Supt	—
Kansas City, C. S. & C. River	W. W. Fagan	Gen. Supt	—
Kansas City, St. Joseph & C. B	J. F. Barnard	Gen. Man	B
Lackawanna & Pittsburgh	W. H. Badger	Gen. Supt	A
Lake Erie, Alliance & Southern	E. E. Scranton	Supt	1891
Lake Erie & Western	Geo. L. Bradbury	Gen. Man	1891
Lake Shore & Mich. Southern	J. E. Childs	Asst. Gen. Man	1892
Lake Shore & Mich. Southern	M. E. Wattles	Supt	B
Lehigh Valley	H. Stanley Goodwin	Gen. Supt	—
Lehigh Valley	Robert H. Sayre	Supt. & Eng	C
Little Rock & Fort Smith	Henry Wood	Gen. Supt	A
Louisville & Nashville	M. H. Smith	V.-Pres	1891
Louisville & Nashville	Chas. O. Parker	Supt	B
Louisville & Nashville	C. D. Purdon	Div. Eng	—
Louisville & Nashville	G. K. McCormick	Res. Eng	1890
Louisville, N. Albany & Chicago	John B. Carson	V.-Pres. & Gen. Man.	—
Louisville, E. Albany & Chicago	Thos. D. Dunn	Gen. Supt	B
Louisville, N. Albany & Chicago	Jas. Baker	Gen. Pass. Agt	1890
Louisville, N. Albany & Texas	J. M. Edwards	V.-Pres. & Gen. Man.	—
Louisville, Evansville & St. Louis	C. A. Darlton	Supt	B
Los Angelos, Pasa & Glendale	John Cross	Pres	1890
Los Angelos, Pasa & Glendale	W. F. McClure	Ch. Eng	1890
Mahony & Susq. Div. P. & R	J. H. Olhausen	Supt	B
Maryland Central	Samuel Rea	V.-Pres	1892
Manitou & Pike's Peak	A. T. Tomlinson	Div. Eng	1890
Manitoba & N. Western	W. C. Baker	Gen. Supt	1890
Manitoba & N. Western	Geo. H. Webster	Ch. Eng	1890
Memphis & Little Rock	Rudolph Fink	Rec. & Gen. Man	B
Metropolitan of Portland, Or	Alfred F. Sears	Supt	—
Mexican National	C. A. Merrian	Supt	B
Michigan Central	B. Douglas	Bridge Eng	1890
Minneapolis, Lynd. & Min	Geo. H. Cooley	Ch. Eng	1890
Minneapolis, St. P. & S. S. Marie	T. D. Underwood	Gen. Man	1891
Minneapolis, St. P. & S. S. Marie	W. W. Rich	Ch. Eng	1890
Minnesota & N. Western	E. G. Russell	Asst. Gen. Supt	A
Missouri Pacific	W. H. Boyd	M. of Trans	B
Mobile & Ohio	T. M. R. Talcott	V.-Pres. & Gen. Man	A
Montana Central	H. C. Ives	Gen. Man	1890
Montana Central	N. C. Ray	Res. Eng	1891
Monterey & Mex. Gulf	J. A. Robertson	Gen. Man	1890
Monterey & Mex. Gulf	W. H. Wentworth	Ch. Eng	1890
Milford F., & Prov. & Hop	E. T. Logee	Gen. Supt	B
Milwaukee, L. Shore & Western	H. F. Whitecomb	Gen. Man	B
Milwaukee, L. Shore & Western	H. G. H. Reed	Gen. Supt	B
Milwaukee & Northern	C. F. Dutton	Gen. Supt	B
Milwaukee & St. Paul	T. D. Underwood	Supt.	B
Morgan's St. Louis & Texas	J. Kruttschmidt	Eng. & Supt	B
Nashville, Chattan. & St. L	Hunter McDonald	Asst. Eng	1891
Nashville & Florence	J. T. Craik	Ch. Eng. & Supt	B

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Natchez, Jackson & Col	E. D. Frost	Gen. Supt	B
Naugatuck	George W. Beach	Supt	A
Nevada Central	F. W. Dunn	Gen. Supt	B
New Haven & Northampton	S. B. Opdyke, jr	Supt	B
New Orleans, Natchez & Ft. Scott	H. D. Jenkins	Ch. Eng	1891
New Orleans & Selma	Norman Webb	Rec	B
Newport News & Miss. Valley	J. L. Frazier	Supt	1891
Newport & Northern	H. H. Vreeland	Supt	1891
Newport & Wickford	Theo. Warren	Supt	B
New York & Boston R. Trans.	W. Rotch	Eng	1891
New York & New England	A. A. Jackson	Gen. Supt	—
New York & New England	J. W. Perkins	Ass. Rec	B
New York Central & H. River	J. M. Toucey	Gen. Supt	A
New York, New Haven & Hartford	C. S. Davidson	Supt	C
New York, New Haven & Hartford	O. M. Sheppard	Gen. Man	1891
New York, Lake Erie & Western	E. S. Bowen	V.-Pres	B
New York, Lake Erie & Western	S. M. Felton, jr	Asst. Pres	B
New York, Ont. & Western	S. W. Lampher	Supt. Tran	1890
New York, Ont. & Western	J. E. Childs	Gen. Supt	B
New York, Prov. & Boston	J. W. Miller	Gen. Man	—
New York, Prov. & Boston	J. B. Gardiner	Supt	B
New York, Susq. & Western	Chas. M. Heald	Pres	1890
New York, Susq. & Western	C. D. McKelvey	Supt	B
New York City & Northern	G. N. B. Edwards	Gen. Supt	A
New York, West Sh. & Buffalo	J. D. Layng	Gen. Man	B
New York & Sea Beach	W. O. McDowell	P.-Pres. & Gen. Man	B
New York, Pitts. & Chicago	G. W. Dixon	Supt	B
New York, Chic. & St. Louis	G. H. Kimball	Supt	B
Nicaragua C. C. Co	J. F. Le Baron	Gen. Supt	1892
Norfolk & Western	Joseph H. Sands	Gen. Man	A
Norfolk & Western	Charles Blackwell	Supt. M. P.	B
Norfolk & Western	Emile Low	Div. Eng	1890
North Western C. & N.	E. T. Galt	Man	1890
North Western C. & N.	J. Bailey	Supt	1890
Northern Pacific	T. F. Oakes	V.-Pres & Gen. Man	A
Northern Pacific	Robert Harris	Pres	B
Northern Pacific	D. R. Taylor	Supt	B
Ohio & Mississippi	J. F. Barnard	Pres. & Gen. Man	1890
Ohio & L. R. W.	B. S. Henning	Pres	C
Ohio Central	J. E. Martin	Rec	B
Old Colony	J. R. Kendrick	Gen. Man	A
Oregon & Washington T.	F. Riffle	Ch. Eng	1891
Oregon Ry. & Nav.	H. S. Rowe	Supt	B
Pennsylvania	S. M. Prevost	Gen. Supt. Trans	1890
Pennsylvania	L. F. Loree	Supt	1891
Pennsylvania	Thos. J. Brereton	Supt	1890
Pennsylvania	O. G. McClellan	Supt	B
Pennsylvania	R. P. Snowdon	Ass. Eng	B
Pennsylvania	S. S. Blair	Supt	B
Pennsylvania	M. W. Thomason	Eng. Main. W	B
Pennsylvania	Robt. Pitcairn	Gen. A. & Supt	1890
Pensacola & Atlantic	W. D. Chipley	V.-Pres. & Gen. Supt	B
Peoria, Decatur & Evansville	G. L. Bradley	V.-Pres	B
Philadelphia & Reading	I. A. Sweigand	Gen. Supt	—
Philadelphia & Reading	M. F. Bonzano	Supt	1890
Philadelphia & Reading	I. A. Higgins	Sta. Agent	1890
Philadelphia & Reading	W. Lorenz	Ch. Eng	B
Pittsburgh, Cincinnati & St. Louis	M. J. Becker	Ch. Eng	1891
Pontiac, Oxford & Port Austin	James Houston	Gen. Supt	1890
Pittsburgh & Lake Erie	E. Holbrook	Gen. Supt	1890
Pittsburgh, Shenango & Lake Erie	I. T. Blair	Gen. Man	1890

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Portland & Ogdensburg	I. Hamilton	Supt	B
Providence & Springfield	W. Tinkham	Pres	B
Providence & Worcester	Chas. Howard	Supt	A
Providence & Worcester	W. E. Chamberlain	Supt	B
Providence, W. & Bristol	W. Stone	Supt. & Eng	B
Pullman Palace Car Company	G. F. Brown	Gen. Supt	B
Prince Edward Island	L. B. Archibald	Supt	C
Quebec & Lake St. John	I. J. Scott	Man	A
Queensboro & Falls of R.	Chas. Seymour	Cons. Eng	1891
Qu'Appelle & Long Lake	H. S. Holt	Eng	1892
Richmond & Allegany	Decatur Axtell	Rec. & Man	B
Richmond & Danville	Julien A. Hall	Asst. Eng	1892
Richmond & Danville	F. M. Rutherfurd	Asst. Eng	1892
Richmond, Fred. & Potomac	E. T. D. Myers	Pres. & Gen. Supt	—
Richmond & Petersburg	J. R. Kenly	Supt	B
Rock Island & Peoria	H. B. Sudlow	Supt	1890
Rochester & Pittsburgh	James T. Gardner	Gen. Supt	B
Rogersville & Jefferson	Chas. M. Lentz	Supt	B
Rome, W. & Ogdensburg	H. M. Britton	Gen. Man	A
San Antonia & Ar. Pass	B. F. House	Asst. Eng	1891
Savannah, Florida & West	H. W. Reed	Mast. R. W.	1891
San Pete Valley	S. Bamberger	Man. Director	B
Seaboard Air Line	John C. Winder	Gen. Man	1891
Seaboard & Roanoke	L. T. Myers	Supt. Trans	1891
Seattle Lake Shore & East	F. W. D. Holbrook	Man	1892
Shenango & Allegany	J. T. Blair	Gen. Man	B
Shenandoah Valley	David W. Flickwir	Supt	1891
Silverton	C. W. Gibbs	Ch. Eng	1890
Skaneateles	J. McNamara	Supt	A
South Florida	B. R. Swoope	Supt	A
South Carolina	John B. Peck	Gen. Man	B
Southern Pacific	J. A. Fillmore	Gen. Supt	1891
Southern Pacific	A. C. Bassett	Supt	B
Southern Pacific	J. Kruttschmidt	Supt	—
Southern Pacific	A. C. Hutchison	Gen. Man	A
Split Rock Cable	W. B. Cogswell	Gen. Man	1890
Staten Island, R. T.	Frank S. Gannon	Gen. Man	1891
St. Joseph & Desloge	T. T. Onderdonk	Gen. Supt	B
St. Johns & Lake Eustes	W. J. Jarvis	Supt	B
St. Louis, Alton & T. Haute	Geo. W. Parker	Gen. Man	B
St. Louis & San Francisco	H. L. Morrill	Gen. Man	A
St. Louis, Arkan. & Texas	A. H. Swanson	Rec	1891
St. Louis, Arkan. & Texas	H. G. Kelley	Res. Eng	1890
St. Louis & Cairo	C. Hamilton	Gen. Supt	B
St. Louis, Des Moines & North	H. H. Wade	Supt	A
St. Louis, Des Moines & North	C. F. Meek	Supt	B
St. Louis, Ft. Scott & Wichita	J. F. Miller	V.-Pres	B
St. Louis, Ft. Scott & Wichita	W. H. Norris	Train Mas	B
St. Paul, Minn. & Manitoba	James J. Hill	Pres	B
St. Paul, Minn. & Manitoba	H. C. Ives	Asst. Gen. Man	B
Stoney Creek	G. B. Boggs	Supt. & Eng	B
Suburban R. Transit	J. J. R. Croes	Ch. Eng	1892
Syracuse, Ont. & N. York	Albert Allen	Gen. Supt	A
Taveres, Orlando & Atlantic	T. M. T. McKennan	Gen. Man	A
Tennessee Coal & Iron	A. M. Shook	Gen. Man	B
Texas & Pacific	John A. Grant	V.-P. & Gen. Man.	1892
Toledo & Ohio Central	J. M. Ferris	Gen. Man	1891
Toledo & Ohio Central	Clifford Buxton	Ch. Eng	1891
Tioga	R. Du Puy	Supt. & Eng	B
Toledo, Peoria & Western	E. N. Armstrong	Gen. Supt	1891
Toledo, St. Louis & Kansas	A. H. Pettibone	Gen. Supt	B

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Toledo, St. Louis & Kansas	S. R. Callaway	Ch. Eng	1890
Toledo, Ann Arbor & N. M	H. W. Ashley	Gen. Supt	B
Toledo, Col. & Cincinnati	Clifford Buxton	Ch. Eng	1891
Troy & Boston	J. Crandell	Supt	A
Ulster & Delaware	J. H. Jones	Gen. Supt	1891
Union Pacific	E. Dickinson	Gen. Man	1891
Union Pacific	S. T. Smith	Gen. Supt	B
Union Pacific	T. Appleton	Res. Eng	1891
Valley	W. Thornburgh	Gen. Man	1891
Virginia & Truckee	H. M. Yerrington	V.-Pres. & Gen. Man	B
Wabash	K. H. Wade	Gen. Supt	A
Wagner Sleeping Car Co	C. D. Flagg	Gen. Supt	—
Western Maryland	J. M. Hood	Pres. & Gen. Man	B
Western Maryland	B. H. Griswold	Gen. F. Agent	1891
Western N. York & Pennsylvania	R. Bell	Gen. Supt	1890
Wisconsin Central	S. R. Ainslie	Gen. Man	1890
West Shore	C. H. Bradley	Gen. Supt	A
Warren & Farnsworth	A. C. Wood	Gen. Man	B
West Virginia, C. & Pittsburgh	W. E. Porter	Gen. Supt	B
Worcester, Nashua & Roch	C. S. Turner	Pres. & Gen. Man	B
Williamsport & N. Branch	Ben. G. Welsh	Pres. & Gen. Man	B
York & Peachbottom	S. M. Manifold	Supt. & Eng	B

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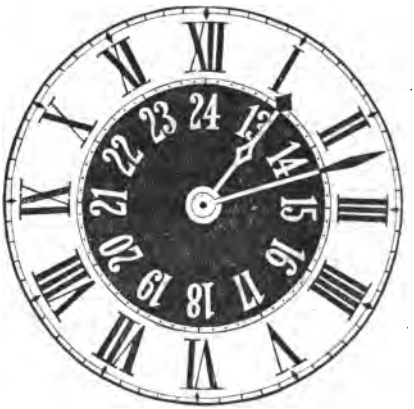
AMERICAN SOCIETY OF CIVIL ENGINEERS.

REPORT OF THE SPECIAL COMMITTEE
ON UNIFORM STANDARD TIME.

THE NEW NOTATION OF TIME.



TO WHICH IS APPENDED, LISTS OF

RAILWAY MANAGERS AND OTHERS

IN FAVOR OF

THE 24-HOUR SYSTEM.

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

NOTE.—This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, NEW YORK, JANUARY 16TH, 1889.

The Special Committee on Uniform Standard Time begs leave respectfully to report:

The last annual report of the Committee referred to action which had been taken by the General Time Convention the year previous, with the view of securing an expression of opinion from members of that association on the subject of the twenty-four-hour notation.

Circulars had been sent out by the Secretary of the General Time Convention, directing attention to the contents of a pamphlet issued by the American Society of Civil Engineers, setting forth the experience which up to that date had been gained on the Central and Mountain Divisions of the Canadian Pacific Railway, where the new notation had been in use for some months. A series of questions also accompanied the circular, to which members of the General Time Convention were requested to furnish replies.

The replies were referred to in the last annual report of this Committee, where, among other things, it was stated that (61) sixty-one affirmative and (38) thirty-eight negative replies had been received in reference to the question, "Are you in favor of the general adoption of the twenty-four-o'clock system of counting the hours—abandoning the use of A.M. and P.M.?"

It was deemed important to ascertain the precise character of the thirty-eight negative replies, and accordingly application was made to the Secretary of the General Time Convention, Mr. W. F. Allen, for copies of the objections which had been offered. Through the courtesy of that gentleman, the information has been received since the last Annual Meeting of this Society.

An examination of all the replies containing objections shows the following expressions of opinion, viz.:

6 That the A.M. and P.M. system is good enough.
5 That there is nothing to be gained by a change.
4 That the people should be educated to the new system before the railways adopt it.
3 That the adoption of the change would cause great confusion.

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2 That it will be impossible to get men to understand the new notation.
2 That it is advisable to delay adopting the new notation until more experience is gained on the railways now using it.
2 That doubts are entertained if it can be brought about.
2 That its adoption should be delayed until all the railways are prepared to adopt the change simultaneously.
1 A preference is expressed for the decimal division of the day.
1 That midnight should be designated ZERO or O, in place of twenty-four hours.
1 Has difficulty in offering any serious objections to the new system.
1 Does not think it concerns the public very much.
1 That it is for the Government to authorize the adoption of the new notation rather than the railways.
1 Is of opinion that the change would involve great expense.
1 That there will be some objection to the change whenever it may be made.
1 Is not sufficiently familiar with the working of the new system.

The deductions from this analysis are, that of the ninety-nine railway managers who in April, 1887, furnished replies to the questions placed before them, there were only six who considered the A.M. and P.M. system good enough, and only five who were then unable to recognize the advantages of the new notation. That the objections were not considered very serious by the writers of them, is evident from the fact that in twenty-one of the thirty-eight negative replies, it is stated that they will be prepared to adopt the twenty-four-hour notation if the connecting lines do the same.

The objections which have been raised are met in the most convincing manner by letters from railway men who have now had from two to three years' daily experience in the use of the new notation in operating railways. These communications are placed at the service of the Committee and comprise the following, viz.:

15 Letters from managers, assistant managers, superintendents and assistant superintendents.
7 Letters from train dispatchers.
8 Letters from conductors.
25 Letters from station masters.
18 Letters from track masters and track foremen.
2 Letters from yard masters.

There is a singular unanimity of opinion expressed in all these letters in favor of the new system. At present, your Committee cannot do better than submit the two communications which have been last received, viz.:

First.—A letter from Mr. Collingwood Schreiber, General Manager of the Intercolonial Railway of Canada, dated the 9th instant.

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Second.—A letter from Mr. W. C. Van Horne, President of the Canadian Pacific Railway, dated the 10th instant.

CANADIAN GOVERNMENT RAILWAYS.
Office of the Chief Engineer and General Manager,
OTTAWA, January 9th, 1889.

DEAR SIR,—I have your letter of yesterday's date, making inquiry as to whether or not the twenty-four-hour system of time notation is still in use upon the Government Railways, and if so, desiring to be informed if it gives satisfaction.

In reply I may say, the twenty-four-hour time notation was introduced upon the Intercolonial Railway (906 miles) and the Eastern Extension Railway (80 miles) on June 13th, 1887; that it has been in most successful operation from that date to this. I anticipated at the time some trouble in having such a novelty introduced, imagining the public press and the employés of the road would combat it, but such has not been the case; not a word of complaint, so far as I am aware, has appeared in the newspapers upon the subject, and our officers and employés, as a rule, appear to view it as an advancement in the right direction, those employés immediately connected with the movement of the trains especially favoring the system. Under this time notation system no confusion can arise, and for this reason greater safety is assured.

For my own part I may say I am strongly in favor of the twenty-four-hour system of time notation, and I propose, so soon as the Oxford and New Glasgow Railway (70 miles), and the Cape Breton Railway (100 miles), now under construction, are completed and turned over to the Operating Department, to extend the system to those lines. I think it would be an advantage if it was more generally used by the railways, and I hope, at no distant day, to see its use very much extended; in fact, it appears to me it would be a great advantage if the railway managers throughout the Continent would put the twenty-four-hour system of time notation in operation upon their roads; it certainly could not but be fraught with good results. I may, however, remark that I do not think the public will readily take it up for general use until such time as it is taught in the public schools; if this was done, I believe it would very soon come into use for all purposes.

I am,
Yours very truly,
(Signed) COLLINGWOOD SCHREIBER,
Chief Engineer and General Manager
Government Railways.

SANDFORD FLEMING, Esq.,
Chairman Special Committee on Standard Time,
Am. Soc. C. E.

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CANADIAN PACIFIC RAILWAY CO.,
MONTREAL, January 10th, 1889.

MY DEAR MR. FLEMING:

Replying to your note of the 6th instant, I am happy to be able to say that our nearly three years' trial of the twenty-four-hour system on all of our lines west of the Great Lakes, embracing 2 354 miles, has been highly satisfactory. No confusion whatever resulted from its adoption or has grown out of its use, and I have yet to hear of the first objection to it on the part of the public.

The Manitoba and North Western Railway Company, 207 miles, and the North Western C. and N. Company's Railway, 110 miles, also follow this system. It is therefore the only system used for railway purposes north of the forty-ninth parallel and west of the eighty-ninth meridian.

We hope soon to be able to extend this system over all the company's lines in the east. We should have done so before this time, if some of our neighboring lines had been in a position to join us in the movement.

A short experience with it must, I believe, convince anybody that it is vastly superior for railway purposes to the old system. It takes a surprisingly short time to come to think of twenty o'clock instead of eight o'clock P. M.

There is no danger in its adoption, even on a very busy line. The term 19.47, for instance, in a train order, cannot be mistaken for anything else. Yours very truly, (Signed) W. C. VAN HORNE.

SANDFORD FLEMING, Esq., C. E., C. M. G.,
Ottawa, Ont.

These letters conclusively establish that the new notation has been thoroughly tested for two or three years on 3 657 miles of railway, that no difficulty whatever has been experienced in introducing the change, that it has been readily accepted by the public without a single objection being heard, that its extreme simplicity and the impossibility of errors resulting from its use facilitates the movements of trains and promotes the public safety. The new system having thus proved so satisfactory in every way, it has now been determined to employ it on 3 053 additional contiguous miles, which will make a total length of 6 710 miles of railway shortly to be operated under the new notation.

It is obvious that there can no longer be any doubt as to the practical advantages of the new system, and the ease with which it can be applied to the operating of any line of railway. The thirty-eight negative replies which have been cited cannot be said to present insuperable difficulties, and it is believed that the writers of them will now have their views greatly modified by the experience which has since been gained and the explanations made in the more recent letters which have been submitted.

Your Committee cannot but think that in the public interest it is advisable that renewed efforts be made to secure the general adoption of the new notation.

SANDFORD FLEMING,
Chairman Special Committee.

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FAVORABLE TO THE 24-HOUR NOTATION.

ADDITIONAL LIST OF NAMES.

List of Railway Managers, Superintendents, etc., who, in their replies to questions issued March 7th, 1887, by the Committee on the 24-Hour Notation of the General Time Convention, gave expression to their approval of the new system, or were so far favorable as to express their willingness to have it adopted on their lines, provided connecting lines agreed to use it.

NAMES.	OFFICIAL POSITIONS.	RAILWAYS.
D. I. Chase	Gen'l Superintendent..	Atchison, Topeka & Santa Fé.
H. Waters	V.-Pres. & Gen'l Man.	Atlantic Coast Line, Richmond Div.
John F. Divine	Gen'l Superintendent..	" " Charlotte "
R. Wood	General Manager	Arkansas Valley.
C. A. Coombs	General Manager	Boston, Hoosac Tunnel & Western.
Robert Williams	V.-Pres. & Supt	Burlington, Cedar Rapids & Nor'n.
J. W. Fry	Gen'l Superintendent..	Cape Fear & Yadkin Valley.
M. S. Belknap	General Manager	Central & Georgia.
O. S. Lyford	General Manager	Chicago & Eastern Illinois.
I. H. Parsons	Superintendent	Chicago & Atlantic.
Fred. Broughton	General Manager	Chicago & Atlantic.
A. B. Atwater	Superintendent	Chicago & Grand Trunk.
H. F. Royce	Gen'l Superintendent..	Chicago, Rock Island & Pacific.
Geo. B. Harris	General Manager	Chicago, Burlington & Northern.
F. G. Darlington	Superintendent	Cincinnati & Muskingum.
R. W. Buckmaster	Supt. Transportation..	Cincinnati, Jackson & Mackinaw.
J. H. Stewart	General Manager	Cincinnati, Washington & Baltimore.
W. Monsarrat	Pres. & Gen'l Man.	Cleveland, Akron & Columbus.
J. D. Layng	President	Clevel'd, Columbus, Cincin. & Ind's.
G. M. Mead	General Manager	" " " "
J. W. Burdick	Gen'l Pass. Agent	Delaware & Hudson Canal Co.
H. G. Young	General Manager	" " "
L. M. Trents	Superintendent	Denver, Utah & Pacific.
D. Thayer	Gen'l Superintendent..	Dunkirk, Alleghany Valley & Pitts.
C. H. Hudson	General Manager	East Tennessee, Virginia & Georgia.
J. J. Phillips	Asst. Gen. Supt	Florida Railway & Navigation Co.
W. W. Worthington	Gen'l Superintendent..	Fort Wayne, Cincinnati & Louisville.
C. L. Frost	Superintendent	Fort Worth & Denver City.
S. A. Hemphill	Superintendent	Georgia Railway.
J. W. Green	General Manager	" "

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NAMES.	OFFICIAL POSITIONS.	RAILWAYS.
T. G. Sage.....	General Manager.....	Georgia Pacific.
Charles Stiff.....	Supt. Southern Div...	Grand Trunk.
A. H. Swanson.....	Gen'l Trans. Man....	Houston & Texas Central.
T. W. Burrows	Superintendent.....	Indianapolis & St. Louis.
Thomas R. Sharp	General Manager.....	Kanawha & Ohio.
G. W. Bender.....	Superintendent.....	Indianapolis, Decatur & Springfield.
W. H. Badger.....	Gen'l Superintendent..	Lackawanna & Pittsburgh.
Geo. H. Nettleton....	General Manager.....	Kansas City, Fort Scott & Gulf.
H. Stanley Goodwin..	Gen'l Superintendent.	Lehigh Valley Railway.
Henry Wood.....	Gen'l Superintendent.	Little Rock & Fort Smith.
Henry Wood.....	Gen'l Superintendent.	Little Rock, Miss. River & Texas.
W. C. Baker.....	Gen'l Superintendent.	Manitoba & Northwestern.
H. F. Whitcomb.....	General Manager.....	Milwaukee, Lake Shore & Western.
T. D. Underwood....	General Manager.....	Minneapolis, Sault Ste. Marie & Atl.
E. G. Russell	Asst. Gen. Supt.....	Minnesota & Northwestern.
T. M. R. Talcott.....	V.-Prest. & Gen. Man.	Mobile & Ohio.
George W. Beach	Superintendent	Naugatuck.
J. M. Toucey.....	Gen'l Superintendent.	New York Central & Hudson River.
G. N. B. Edwards....	Gen'l Superintendent.	New York City & Northern.
J. E. Childs.....	General Manager.....	New York, Ontario & Western.
J. W. Miller.....	General Manager.....	New York, Providence & Boston.
C. D. McKelvey	Superintendent.....	New York, Susquehanna & Western.
Joseph H. Lands.....	General Manager.....	Norfolk & Western.
T. F. Oakes.....	V.-Pres. & Gen. Man.	Northern Pacific.
J. F. Barnard.....	President & Gen. Man.	Ohio & Mississippi.
I. R. Kendrick.....	General Manager	Old Colony.
Charles Homard.....	Superintendent.....	Providence & Worcester.
E. T. D. Myers.....	General Manager.....	Richmond, Fredericksburg & Poto.
H. M. Britton	General Manager.....	Richmond, Watertown&Ogdensburg
H. L. Morrell.....	General Manager.....	St. Louis & San Francisco.
H. H. Wade.....	Superintendent.....	St. Louis, Des Moines & Northern.
L. T. Meyers.....	Supt. Transportation..	Seaboard & Roanoke.
David W. Flickner...	Superintendent.....	Shenandoah Valley.
I. McHarraman.....	Superintendent.....	Skaneateles.
B. R. Swoope.....	Superintendent.....	South Florida.
A. C. Hutchison.....	General Manager.....	Southern Pacific—Atlantic System.
Albert Allen.....	Gen'l Superintendent..	Syracuse, Ontario & New York.
T. McKerran.....	General Manager.....	Taveres, Oralando & Atlantic.
D. W. Whitney.....	Gen'l Superintendent..	Toledo, Ann Arbor & N. Michigan.
J. M. Tims.....	General Manager.....	Toledo & Ohio Central.
A. H. Pettibone.....	Gen'l Superintendent..	Toledo, St. Louis & Kansas City.
J. Crandell.....	Superintendent.....	Troy & Boston.
S. T. Smith.....	Gen'l Superintendent..	Union Pacific.
K. H. Wade.....	Gen'l Superintendent..	Wabash.
F. F. Talmage.....	General Manager.....	Wabash, St. Louis & Pacific.
J. M. Hood.....	General Manager.....	Western Maryland.
C. H. Bradley.....	Gen'l Superintendent..	West Shore.

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FAVORABLE TO THE 24-HOUR NOTATION.

LIST PUBLISHED JANUARY, 1887,

Of Railway Superintendents, Managers, Presidents and others from whom an expression of opinion has been received favorable to the general adoption of the 24-o'clock system throughout North America. There are many others favorable who have not been heard from in writing. The following have, however, given unqualified expression to their opinions and are ready at the proper moment to adopt the change.

RAILWAY.	OFFICIAL NAME AND TITLE.	ADDRESS.
Adirondack Ry.....	C. E. Durkee, Superintendent..	Saratoga Springs, N. Y.
Allegheny Valley Ry...	David McCargo, Gen. Sup't...	Pittsburgh, Pa.
Atchison, Topeka and Santa Fé Ry. and South Kansas Ry.....	A. A. Robinson, Gen Manager.	Topeka, Kansas.
Atlantic Div. East Tenn., Virginia and Georgia Ry.....	J. W. Fry, Superintendent.....	Atlanta, Ga.
Atlantic and North Carolina Ry.....	W. Dunn, Superintendent.....	Newberne, N. C.
Bellaire, Zanesville and Cincinnati Ry.....	W. R. Crompton, Gen. Mgr...	Woodsfield, Ohio.
Belvidere Div. Penna. Ry.....	J. A. Andrews, Superintendent	Lambertville, N. J.
Bennington and Rutland Ry.....	F. C. White, Gen. Supt.....	Bennington, Vt.
Boston, Barre and Gardner Ry.....	H. H. Marshall, Supt. and Traffic Manager.....	Worcester, Mass.
Boston, Hoosac Tunnel and Western Ry.....	H. L. Morrill, General Manager	Saratoga, N. Y.
Boston, Hoosac Tunnel and Western Ry.....	Chas. H. Cory, Supt.....	Mechanicville, N. Y.
Boston and Lowell Ry...	C. S. Metten, Gen. Supt.....	Boston, Mass.
Boston and Providence Ry.....	Albert A. Folsom, Supt.....	Boston, Mass.
Boston, Revere Beach and Lynn Ry.....	C. A. Hammond, Supt.....	350 Atlantic ave., Boston, Mass.
Brooklyn, Bath and Coney Island Ry.....	Geo. A. Gunther, Gen. Mgr....	27th st. and 5th ave., Brooklyn, N. Y.
Brunswick and Western Ry.....	H. S. Morse, Gen. Mgr.....	Brunswick, Ga.
Buffalo, New York and Phila. R. R.....	Geo. S. Gatchell, Gen. Supt....	Buffalo, N. Y.
California Southern R. R	J. N. Victor, Supt.....	National City, Cal.

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Railway.	Official Name and Title.	Address.
Canadian Government Railways, Intercolonial System, Prince Edward Island System ..	Collingwood Schreiber, Chief Engineer and Gen. Manager.	Ottawa, Canada.
Canadian Pacific Ry....	W. C. Van Horne, Vice-Pres...	Montreal, Canada.
Canadian Pacific Ry....	T. G. Shaughnessy, Asst. Gen. Man.....	Montreal, Canada.
Canadian Pacific Ry....	W. Whyte, Gen. Supt.....	Winnipeg, Canada.
Canadian Pacific Ry....	Henry Beatty, Manager Steamship Lines.....	Toronto, Canada.
Cape Fear and Yadkin Valley Ry.....	J. S. Morrison, Chief Engineer and Gen. Supt.....	Fayetteville, N. C.
Central Iowa Ry.....	D. P. Phelps, Asst. Supt.....	Monmouth, Ill.
Central Road and Banking Co. of Georgia....	William Rogers, Gen. Supt....	Savannah, Ga.
Central Vermont R. R..	J. W. Hobart, Gen. Man.....	St. Albans, Vt.
Central Vermont R. R..	C. A. Converse, Asst. Supt. Local Freight Traffic	St. Albans, Vt.
Chattoroi Ry.....	F. H. Oliphant, Gen. Man....	Ashland, Ky.
Chesapeake, Ohio and S. W. R. R.....	J. L. Frazier, Supt.....	Louisville, Ky.
Chicago, Fairchild and Eau Claire R. R.....	G. A. Foster, Sec'y and Asst. Gen. Manager.....	Fairchild, Wis.
Chicago and Grand Trunk Ry.....	W. H. Pettibone, Supt.....	Battle Creek, Mich.
Chicago, Rock Island and Pacific Ry.....	A. Kimball, Vice-President and Gen. Manager.....	Chicago, Ill.
Chicago, Rock Island and Pacific Ry.....	H. T. Royce, Asst. Gen. Supt.	Davenport, Iowa.
Chippewa Valley and Chicago and West Michigan Ry	A. M. Nichols, Gen. Supt.....	Grand Rapids, Mich.
Wabasha Div. Chicago, Milwaukee & St. Paul Ry	J. H. Lakey, Supt.....	Wabasha, Minn.
Cincinnati, Ham. & Dayton Ry.....	C. C. Waite, Vice-President...	Cincinnati, Ohio.
Cincinnati, New Orleans and Texas Pacific and Associate Roads.....	R. Carroll, Gen. Supt.....	Cincinnati, Ohio.
Cincinnati, Van Wert and Mich. Ry.....	Everett Garrison, Gen. Manager and Chief Engineer.....	Greenville, Ohio.
Cincinnati, Washington and Balto. Ry..... ..	J. H. Stewart, Gen. Man.....	Cincinnati, Ohio.
Columbus, Hocking Valley and Toledo Ry ...	G. R. Carr, Gen. Supt.....	Columbus, Ohio.
Columbus and Western Ry.....	E. A. Flewellen, Gen. Man....	Opelika, Ala.
Conotton Valley Ry....	Samuel Briggs, Receiver and Gen. Manager.....	Cleveland, Ohio.

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RAILWAY.	OFFICIAL NAME AND TITLE.	ADDRESS.
Coudersport and Port Allegheny Ry.	B. A. McClure, Gen. Supt	Coudersport, Pa.
Denver and Rio Grande Ry	Cole Lydon, Div. Supt. (2d Div.)	Alamosa, Col.
Denver, Utah and Pacific Ry.	L. M. Fonts, Supt.	Denver, Col.
Detroit, Mackinac and Marquette Ry	D. McCool, Gen. Supt.	Marquette, Mich.
Eastern Div. Flint and Pere Marquette Ry.	William F. Potter, Supt.	East Saginaw, Mich.
East Tennessee, Virginia and Georgia Ry.	Henry Fink, Vice-President and Gen. Manager, and Gen. Manager Memphis and Charleston	Knoxville, Tenn.
East and West Ry. of Alabama	John Postell, Gen. Manager	Cedartown, Ala.
Eureka and Palisade Ry.	B. Gilman, Gen. Supt.	Eureka, Nev.
Eureka Springs Ry.	Powell Clayton, Vice-President and Gen. Manager	Eureka Springs, Ark.
Flint and Pere Marquette Ry	D. Edwards, Asst. Gen. Manager	East Saginaw, Mich.
Flint and Pere Marquette Ry	Geo. M. Brown, Road Master.	East Saginaw, Mich.
Fort Worth and Denver City Ry.	C. L. Frost, Supt.	Fort Worth, Tex.
Galveston, Sabine and St. Louis Ry	Brad Barner, First Vice-President and Gen. Manager	Longview, Tex.
Georgia Pacific Ry.	I. W. Sage, Gen. Supt.	Birmingham, Ala.
Grand Southern Ry.	F. W. Holt, Supt. and Engineer	St. George, N. B., Canada.
Grand Trunk Railway of Canada	Wm. Wainwright, Asst. Man.	Montreal, Canada.
Grand Trunk Railway of Canada	J. Stephenson, Supt.	Montreal, Canada.
Green Bay, Winona and St. Paul Ry	Timothy Case, Gen. Supt.	Green Bay, Wis.
Gulf, Western Texas and Pacific Ry.	M. D. Monserrate, President and Supt.	Cuero, Texas.
Hartford and Connecticut W. Ry.	John F. Jones, Gen. Supt.	Hartford, Conn.
Houston, East and West Texas Ry.	Wm. H. Wentworth, Asst. Gen. Manager	Houston, Texas.
Houston and Texas Central Ry	J. Waldo, Vice-President	Houston, Texas.
Houston and Texas Central Ry	A. H. Swanson, Gen. Transportation Manager	Houston, Texas.
Houston and Texas Central Ry.	M. G. Howe, Eng. and Supt. First Div.	Houston, Texas.
Houston and Texas Central Ry.	Donald Allen, Eng. and Supt. Third Div.	Houston, Texas.

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RAILWAY.	OFFICIAL NAME AND TITLE.	ADDRESS.
Illinois Central Ry.....	E. T. Jeffery, Gen. Supt.....	Chicago, Ill.
Illinois Div. Chicago, Rock Island and Pacific Ry.....	R. H. Chamberlin, Supt.....	Chicago, Ill.
Indiana, Illinois and Iowa Ry.....	T. P. Shonts, Gen. Supt.....	Kankakee, Ill.
Intercolonial Ry.....	D. Pottinger, Chief Supt.....	Moncton, N. B., Can.
Intercolonial Ry.....	P. S. Archibald, Chief Engineer	Moncton, N. B., Can.
International Ry.....	D. E. McFee, Supt.....	Sherbrooke, Can.
International Div. Missouri Pacific Ry.....	W. H. Boyd, Master of Transportation.....	Palestine, Texas.
Kalamazoo Div. Lake Shore and Michigan Southern Ry.....	M. E. Wattles, Supt..... ...	Kalamazoo, Mich.
Kansas City, St. Joseph and Council Bluffs, and Hannibal and St. Joseph Roads.....	J. F. Barnard, Gen. Man.....	St. Joseph, Mo.
Jacksonville Southeastern Ry.....	E. S. Greenleaf, Supt.....	Jacksonville, Ill.
Jeffersonville, Madison and Indianapolis Ry..	E. W. McKenna, Supt.....	Louisville, Ky.
Kansas Div. Union Pacific Ry.....	S. T. Smith, Gen. Supt.....	Kansas City, Mo.
Knox and Lincoln Ry..	C. A. Coombs, Supt.....	Bath, Me.
Lehigh Valley Ry.....	H. Stanley Goodwin, Gen. Supt	Bethlehem, Pa.
Long Island Ry.....	C. E. Topping, Supt. Telegraph	Long Island City, N. Y.
Louisville, Evansville and St. Louis Ry.....	C. A. Darlton, Supt.....	Louisville, Ky.
Louisville, New Albany and Chicago Ry.....	Theo. D. Dunn, Gen. Supt....	Chicago, Ill.
Mahony and Susq. Div. P. and R. Ry.....	J. H. Olhausen, Supt.....	Pottsville, Pa.
Memphis and Little Rock Ry.....	Rudolph Fink, Receiver and Gen. Manager.....	Little Rock, Ark.
Mexican National Ry...	C. A. Merriam, Supt.....	Laredo, Texas.
Middle Div. Penna. Ry.	O. E. McClellan, Supt.....	Harrisburg, Pa.
Milford, Franklin and Providence and Hopkington Ry.....	E. T. Logee, Gen. Supt.....	Milford, Mass.
Milwaukee, Lake Shore and Western Ry.....	H. G. H. Reed, Gen. Supt....	Milwaukee, Wis.
Milwaukee and Northern Ry.....	C. F. Dutton, Gen. Supt.....	Milwaukee, Wis.
Morgan's Louisiana and Texas Ry.....	J. Kruttschmitt, Eng. and Supt.	New Orleans, La.
Missouri Div. Northern Pacific Ry.....	F. Greene, Asst. Supt.....	Mandan, Dak.
Nashville & Florence Ry.	J. T. Craik, Chief Eng. & Supt.	Columbia, Tenn.
Natchez, Jackson and Columbia Ry.....	E. D. Frost, Gen Supt.....	Natchez, Miss.
Nevada Central Ry.....	F. W. Dunn, Gen. Supt..... ..	Battle Mountain, Nev.
Newport and Wickford Ry. and Steamboat Co.	Theo. Warren, Supt.....	Newport, R. I.

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RAILWAY.	OFFICIAL NAME AND TITLE.	ADDRESS.
New Haven and Northampton Ry.....	S. B. Opdyke, Jr., Supt.....	New Haven, Conn.
New York, Chicago and St. Louis Ry.....	G. H. Kimball, Supt.....	Cleveland, Ohio.
New York City and Northern Ry.....	F. S. Gannon, Gen. Supt.....	High Bridge, N. Y.
New York, Lake Erie and Western Ry.....	E. S. Bowen, Vice-President...	New York City.
New York, Lake Erie and Western Ry., operating New York, Penna. and Ohio Ry.....	S. M. Felton, Jr., Asst. to Pres't	Cleveland, Ohio.
New York, Ontario and Western Ry.....	J. E. Childs, Gen. Supt.....	New York.
New York, Ontario and Western Ry.....	C. W. Lanpher, Div. Supt....	Norwich, N. Y.
New York, Pittsburgh and Chicago Ry.....	G. W. Dixon, Supt.....	New Galilee, Pa.
New York, Providence and Boston Ry.....	J. B. Gardiner, Supt.....	Providence, R. I.
New York and Sea Beach Ry.....	Wm. O. McDowell, Vice-Pres't and Gen. Manager.....	New York City.
New York and New England Ry.....	J. W. Perkins, Asst. to Receiver	Boston, Mass.
New York, West Shore and Buffalo Ry.....	J. D. Layng, Gen. Man.....	New York.
New Orleans and Selma Ry.....	Norman Webb, Receiver.....	Selma, Ala.
Norfolk and Western Ry. and Shenandoah Valley Ry.....	Charles Blackwell, Supt. of Motive Power.....	Roanoke Va.
Northern Ry. of Canada.	Samuel Barker, Gen. Man.....	Toronto, Can.
Northern Div. Chicago, Milwaukee and St. Paul Ry.....	L. B. Rock, Supt	Milwaukee, Wis.
Northern Div. Southern Pacific Ry.....	A. C. Bassett, Supt.....	San Francisco.
Northern Pacific Ry....	Robert Harris, President.....	New York.
Northern Pacific Ry....	T. B. Oakes, Vice-President and Gen. Manager.....	St. Paul, Minn.
Ohio Central Ry.....	J. E. Martin, Receiver.....	Toledo, Ohio.
Old Colony Ry	J. R. Kendrick, Gen. Manager.	Boston, Mass.
Oregon Ry. and Nav.Co.	H. S. Rowe, Supt.....	Portland, Or.
Oswego & Syracuse Div. Delaware, Lackawanna and Western Ry.	W. B. Phelps, Supt.....	Oswego, N. Y.
Pennsylvania Ry.....	R. P. Snowden, Asst. Engineer Maintenance of Way.....	Camden, N. J.
Pennsylvania R. R. Div. P. Ry.....	M. W. Thomason, Engineer Maintenance of Way.....	Altoona, Pa.
Pensacola & Atlantic Ry.	W. D. Chipley, Vice-President and Gen. Supt.....	Pensacola, Fla.

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RAILWAY.	OFFICIAL NAME AND TITLE.	ADDRESS.
Peoria, Decatur and Wansville Ry	G. L. Bradbury, Vice-President	Peoria, Ill.
Philadelphia and Reading Ry	W. Lorenz, Chief Engineer	Philadelphia, Pa.
Pontiac, Oxford and Port Austin Ry	James Houston, Gen. Supt.	Pontiac, Mich.
Portland&Ogdensb'g Ry.	J. Hamilton, Supt	Portland, Me.
Providence and Springfield Ry	Wm. Tinkham, President	Providence, R. I.
Providence and Worcester Ry	W. E. Chamberlain, Supt	Providence, R. I.
Providence, Warren and Bristol Ry	W. Stone, Supt. and Engineer	Providence, R. I.
Pullman Palace Car Co.	George F. Browne, Gen. Supt.	Chicago, Ill.
Quebec & L.St. John Ry.	J. G. Scott, Sec'y and Manager.	Quebec, Canada.
Richmond and Alleghany Ry	Decatur Axtell, Receiver and Manager	Richmond, Va.
Richmond, Fredericksb'g and Potomac Ry	E. T. D. Myers, Gen. Supt.	Richmond, Va.
Richmond and Petersburg Ry	J. R. Kenly, Supt.	Richmond, Va.
Rochester Div. Buffalo, New York and Phila. Ry	J. W. Watson, Supt	Olean, N. Y.
Rochester and Pittsburgh Ry	James T. Gardner, Gen. Supt.	Buffalo, N. Y.
Rogersville and Jefferson Ry	Chas. M. Lentz, Supt.	Bull's Gap, Tenn.
San Antonio Div. Galveston, Harrisburg and San Antonio Ry	W. G. Van Vleck, Supt	San Antonio, Tex.
San Pete Valley Ry.	S. Bamberger, Manag. Director	Salt Lake City, Utah.
Sea Board&Roanoke Ry.	E. Ghio, Supt. Transportation.	Portsmouth, Va.
Shenango and Allegheny Ry	J. T. Blair, Gen. Manager	Greenville, Pa.
South Carolina Ry.	John B. Peck, Gen. Manager	Charleston, S. C.
Southern Div. Illinois Central Ry	C. M. Sheafer, Supt	New Orleans, La.
Southern Minnesota Div. Chicago, Milwaukee and St. Paul Ry.	F. D. Underwood, Supt	La Crosse, Wis.
St. Joseph & Desloge Ry.	T. T. Onderdonk, Gen. Supt.	Bonne Terre, Mo.
St. Johns and Lake Eustis Ry	W. J. Jarvis, Supt.	Fort Mason, Fla.
St. Louis, Alton and Terre Haute Ry. (St. Louis & Cairo Short Line)	Geo. W. Parker, Gen. Manager	St. Louis, Mo.
St. Louis and Cairo Ry.	C. Hamilton, Gen. Supt.	St. Louis, Mo.
St. Louis Div. Louisville and Nashville Ry	Chas. O. Parker, Supt	Evansville, Ind.
St. Louis, Des Moines and Northern Ry	C. F. Meek, Supt.	Des Moines, Iowa.
St. Louis, Fort Scott & Wichita Ry	I. W. Miller, Vice-President.	Fort Scott, Kansas.

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RAILWAY.	OFFICIAL NAME AND TITLE.	ADDRESS.
St. Louis, Fort Scott & Wichita Ry.....	W. H. Norris, Train Master	Fort Scott, Kansas.
Stony Creek Ry.....	Gen. B. Boggs, Supt. and Engineer	Norristown, Pa.
St. Paul, Minneapolis & Manitoba Ry	James J. Hill, President..... ..	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba Ry.....	H. C. Ives, Gen. Man.'s Asst..	St. Paul, Minn.
Tennessee Coal&Iron Ry	A. M. Shook, Gen. Manager...	Tracy City, Tenn.
Tioga Ry.....	R. Du Puy, Supt. and Engineer	Blossburg, Pa.
Toledo, Ann Arbor and North Michigan Ry...	H. W. Ashley, Gen. Supt.	Toledo, Ohio.
Truckee Div. Central Pacific Ry.....	J. H. White, Supt.....	Wadsworth, Neb.
Tyrone Div. Penn. Ry..	S. S. Blair, Supt.....	Tyrone, Pa.
Virginia & Truckee Ry..	H. M. Yerrington, Vice-President and Gen. Supt..	Carson City, Nev.
Warren and Farnsworth Valley Ry.....	A. D. Wood, Gen. Manager...	Warren, Pa.
West Virginia, Central and Pittsburgh Ry....	W. E. Porter, Gen. Supt.....	Piedmont, W. Va.
Worcester, Nashua and Rochester Ry.....	C. S. Turner, Pres. and G. Man.	Worcester, Mass.
York & Peachbottom Ry	S. M. Manifold, Supt. and Engineer.....	York, Pa.
Williamsport and North Branch Ry.....:...	Benj. G. Welch, President and Gen. Manager.....	Hughesville, Pa.

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FAVORABLE TO THE 24-HOUR NOTATION.

First List Published in 1884.

First list, published in 1884, of Engineers, Railway Presidents, Traffic Managers, Scientists and other prominent persons, who, in their replies to questions issued in 1882 by the Standard Time Committee, American Society of Civil Engineers, gave their unqualified preference for a division of the day into a single series of hours numbered from one to twenty-four (1 to 24).

Only eight (8) per cent. of all heard from expressed themselves as unfavorable to the 24-o'clock notation.

The names with an asterisk (*) are members of the American Society of Civil Engineers.

NAME.	OFFICIAL TITLE.	ADDRESS.
W. J. McAlpine, M. I. C. E.*	Past Pres. Am. Soc. Civil Engin'rs	Bay Ridge, N. Y.
M. J. Becker*.....	Chief Eng'r P. C. & St. L. R. W. Co.	Pittsburgh, Pa.
Martin W. Harrington..	Director Astron. Observatory ..	Ann Arbor, Mich.
H. T. Eddy, Ph.D.	Prof. of Mathematics, Astron. and Civil Eng., Univer. of Cincinnati	Cincinnati, Ohio.
Robert Fletcher, Ph.D.*	Prof. of Civil Engineering.	Hanover, N. H.
P. H. Philbrick*.....	Prof. C. E., State Univ. of Iowa.	Iowa City, Iowa.
E. A. Doane*.....	Chief. Eng. Rome, W. & Og'gh. R.	Oswego, N. Y.
Henry B. Richardson*..	Chief State Engineer.....	New Orleans, La.
H. Stanley Goodwin*...	Asst. Gen. Super. Lehigh Valley R. R. Co.....	Bethlehem, Penn.
Robert Briggs*.....	.....	Philadelphia, Pa.
S. Spencer.....	3d V. Pres. B. & O. R. R.....	Baltimore, Md.
C. B. Comstock*.....	Lieut.-Colonel of Engineers	Detroit, Mich.
W. A. Doane*.....	Prin. Asst. Eng. R. W. & O. R. R..	Oswego, N. Y.
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REMARKS ON THE 24-HOUR NOTATION BY THE CHAIRMAN OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME, AMERICAN SOCIETY OF CIVIL ENGINEERS.

1. The practice of dividing the day into halves, numbered 1 to 12 in each case, distinguished as A.M. and P.M., has long been in use, but there is nothing to recommend it but custom and antiquity.

2. If this system of division be attended by any special benefit, it may be asked would it not equally be an advantage to have the hour, the week, the month, similarly divided into half hours, weeks and months, the one half in contradistinction to the other?

3. If the practice be good and wise, why not extend it to the currency, and reckon by half dollars of fifty cents, in place of whole dollars of one hundred cents?

4. The division of the day into halves at noon is productive of inconvenience, and the feeling must be one of surprise that it was ever made.

5. Since the introduction of railways, countless mistakes and delays involving loss have occurred, owing to the misprinting of the letters A.M. or P.M. Even when these letters are correctly given, the detail of the time table is very often understood with difficulty. There is scarcely a traveler who has not to regret some misunderstanding, and disappointment, arising from this imperfect distinction.

6. The old A.M. and P.M. usage offers no single advantage. The new system of reckoning the hours from one to twenty-four is without a single objection. It is in use on thousands of miles of railway with singular success.

7. The adoption of the new notation completely removes all doubt as to the hours of the day. In special cases during its introduction, it may be well to add some explanatory words; thus, it could be stated with reference to an important engagement, "It will take place at 19.45 (7.45 o'clock, P.M., Old style"). Generally such addenda will not be necessary, and in a short period the new nomenclature may be used without explanation in any case.

8. It is suggested that a "colon," two vertical dots between the hours and minutes (thus 19:45 or 17:08), will be a sufficient distinctive mark for all ordinary purposes. A "colon," so placed, will at once denote time and separate the hours from the minutes in the same manner as a single dot denotes decimals and separates whole numbers from parts of numbers. Generally there will be no necessity for adding the words "o'clock," or "hours" or "minutes." A "colon" so placed will be taken to denote time as unmistakably as % denotes per cent., as the sign $ stands for dollars, and as £ s. d. are the symbols for pounds, shillings and pence.

9. The 24-hour notation has received the authority of the Washington Conference. The representatives of the first of the world's nations

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resolved that the old usage of numbering the day by two sets of hours (twelve in each set) should be discarded, and that the hours of the universal day should be continued in a single series, from one to twenty-four (1 to 24). A slight acquaintance with modern scientific publications will establish that the new notation is favored by all men of intelligence who have examined the question.

10. The 24-hour notation will not involve any change in the character of ordinary clocks and watches now in use. All that is necessary is to place on their dials the new numbers of the afternoon hours in an inner circle, as shown in the diagram, or in such other manner as experience may dictate. The temporary means employed by railway managers in introducing the new notation is described on the last page.

Adoption of the 24-hour Notation.

1. The adoption of the 24-hour notation is favored by prominent men of science in Russia, Germany, Italy, Spain, France, Great Britain; and indeed throughout Europe generally. It is warmly supported in the United States and Canada. It has no stronger advocates than the Imperial Astronomer of Russia and the Astronomer Royal of England. It has long been in common use in Italy and Bohemia. One of the great clocks over the portico of St. Peter's, at Rome, has the dial adapted to the 24-hour notation.

2. It has been brought into daily use on the great lines of telegraph communicating from England to Egypt, India, China, Australia and South Africa.

3. The Canadian Pacific Railway adopted the notation on the opening of the line from Lake Superior to the Pacific Coast in 1886. It has continued in use only to obtain more assured favor.

4. It has likewise been accepted by the Canadian Government on the Intercolonial line from Quebec to Halifax. Since the beginning of 1888 it has been employed for railway purposes in the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Assiniboia, Alberta and British Columbia. A few months back the 24-hour system was adopted on the railways in China.

5. Wherever it has been adopted on railways it has been found advantageous in facilitating the movement of trains and promoting the public safety. Experience has shown that, in the more intelligent and progressive communities, the public have readily accepted the change. The press, generally, has expressed a favorable opinion with regard to the new notation.

6. It has been received with favor in nearly every quarter where it has been considered, and it is believed the day is not far distant when it will be brought into common use on railways generally throughout the world.

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7. In introducing the 24-hour notation the railway managers provide the means of adapting existing clocks and watches to the change. Extra dials are prepared and furnished free of cost to employees and to others who may desire them. The following directions for applying the new dials are generally issued.

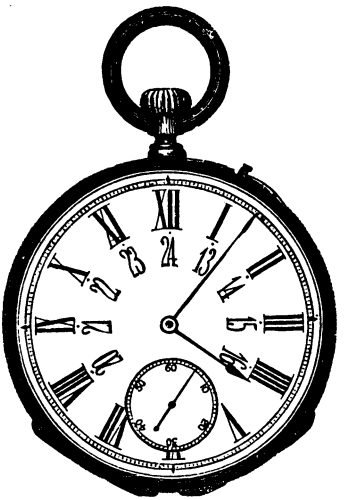
DIRECTIONS FOR APPLYING THE NEW DIALS.

"The extra dials furnished are of thin paper of sufficient size to contain the new afternoon hours, 13 to 24, within the existing Roman numerals I to XII. They are cut to the proper size, pierced for the axis of the hands, coated with gum like an ordinary postage stamp and made ready for application.

"If the watch or clock has a second hand, a segment should be removed from the extra dial to make room for it.

"In applying a new dial, moisten every part of its gummed surface, carefully place it in position, and press it evenly and firmly so that every portion will adhere to the old dial. Unless this be done, the new dial may scale off or blister, and interfere with the hands.

"The best time to apply the new dials is at half-past four, half-past five, half-past six or half-past seven, when hour and minute hands are together and little in the way."



This temporary and inexpensive expedient admirably answers the desired purpose. Clock and watch manufacturers are now beginning to furnish other and more permanent means to meet the requirements of the new notation.

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